335

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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Schematics, Motorola

y21k53B, BA, m, mA ; y21k55B, BA, m, mA
y21T32B, BA, CH, cAA, mgA,
y21T34B, BA, m, mA ; y24T5BG, mG ;
y21k53B, BA, m, mA ; y21k55B, BA, m, mA ;
21T32B, BA, CH, cHA, MGA ; 21T34B, BA, m, mA ; 24T5BG
mG (chassis, TTS-537) y, TS-537, y, WTS-537, y

335-20-S

Schematics, Philco

E2002C,

UE2002C (Ch. 7E10)

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 16 IN SET 287

Truetone Models 2D1411A and 2D1411B were covered in Photofact Folder 16 — Set 287.

Model 2D1411C is electrically identical to the models covered, except for the following changes.

NEW TUNER

A new VHF tuner is corporated in Model 2D1411C. A schematic of this tuner is given on the reverse side. Alignment procedure will be the same as originally given.

COMPONENT CHANGES

R38 is increased from 100K to 1Meg.

C44 is increased from 33MMF to 100MMF.

A 1000MMF capacitor is added from pin 9 of V7 to ground.

R40 is decreased from 33K to 12K.

R86 is decreased from 470K to 330K.

R87 is omitted.

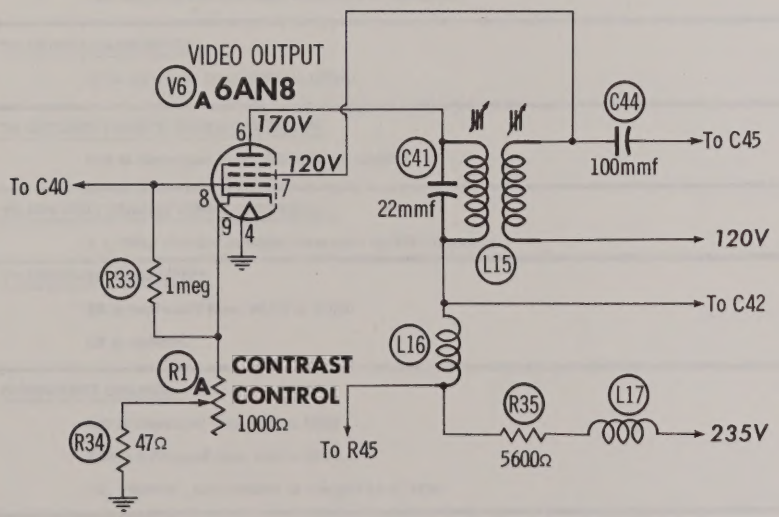
C83 is decreased from .01MFD to 5000MMF.

R20 is decreased from 12K to 5.6K.

C41 is decreased from 51MMF to 22MMF.

R85 is increased from 220K to 470K.

The video output circuit has been revised. A partial schematic is given below showing the new circuit arrangement.



TRUETONE MODEL 2D1411C

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PRODUCTION CHANGES
BULLETIN 172

PRODUCTION CHANGES
BULLETIN 172

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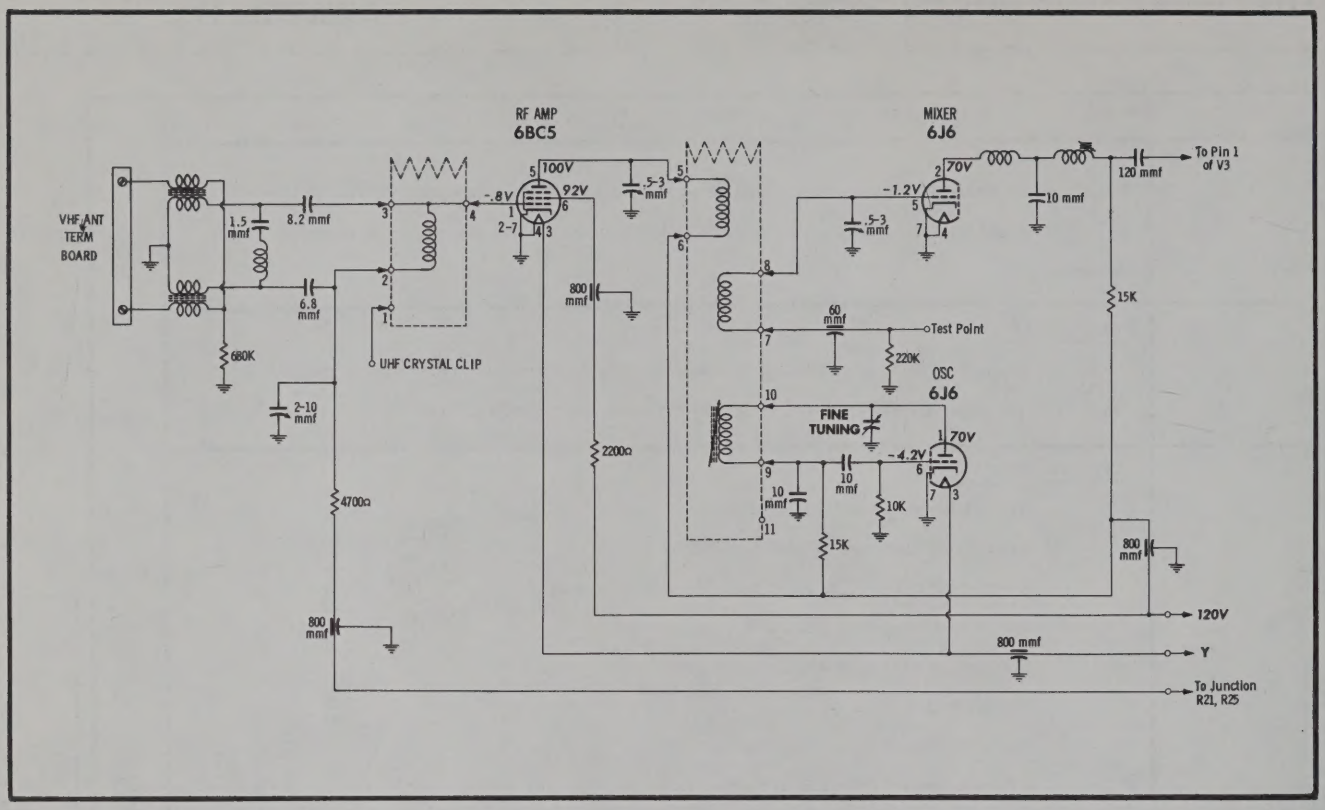
RF AMP
6BC5
MIXER
6J6
OSC
6J6
VHF ANT TERM BOARD
1.5 mmf
8.2 mmf
6.8 mmf
680K
2-10 mmf
UHF CRYSTAL CLIP
4700Ω
800 mmf
100V
92V
-.8V
2-7
.5-3 mmf
800 mmf
2200Ω
70V
-1.2V
.5-3 mmf
10 mmf
120 mmf
To Pin 1 of V3
15K
60 mmf
Test Point
220K
FINE TUNING
70V
-4.2V
10 mmf
10 mmf
10K
15K
800 mmf
120V
800 mmf
Y
To Junction R21, R25

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 10 IN SET 327

RCA VICTOR MODEL 7-BT-9J (Ch. RC-1159)

RCA Model 7-BT-9J (Ch. RC-1159) was covered in Photofact Folder 10 — Set 327.

The following changes were made late in production.

COMPONENT CHANGES

A few receivers were made in which R10 was removed and replaced with a jumper wire.

R5 is increased from 22K to 47K.

R6 is omitted.

R17 is decreased from 12K to 10K, 5%.

R19 is changed to tolerance of 5%.

A 45MFD @ 10V capacitor is added in parallel with C1.

TO REDUCE REGENERATIVE SQUEAL

R3 is increased from 390Ω to 560Ω.

TO IMPROVE RECEIVER OPERATION

R4 is removed.

A 150K resistor is added from C5 to the junction of R2 and C10.

A crystal diode, type 1N295 or 1N60 (part #101615) is added from the collector of X2 to the junction of C13 and R10. The cathode of the crystal diode is connected to the collector of X2.

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 8 IN SET 279

MOPAR MODELS 902 (C-5595), 903 (C-9956)

Mopar Models 902 (C-5595) and 903 (C-5596) were covered in Photofact Folder 8 — Set 279.

The following changes were made late in production.

Run 51	TO REDUCE SENSITIVITY R3 is increased from 1000Ω to 1500Ω.
Run 52	TO IMPROVE SEARCH TUNER OPERATION C24 is decreased from .033MFD to .01MFD.
Run 53	TO PREVENT SEARCH TUNER OVERSHOOT A 4.7Meg resistor is added from pin 7 of V6B to ground.
Run 57	TO INCREASE SENSITIVITY R3 is decreased from 1500Ω to 470Ω. C3 is omitted.
C-5596	COMPONENT CHANGES R31 is increased rom 68Ω to 220Ω. R32 is increased from 68Ω to 220Ω. M1, vibrator, part number is changed to 41-2054.

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BAGPIPER
MODEL SKR101

BAGPIPER
MODEL SKR101

TRADE NAME	Bagpiper Model SKR101
MANUFACTURER	Radio Div., Lawrence Co., LTD., 2330 Victory Parkway, Cincinnati 6, Ohio
TYPE SET	Battery Operated Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Converter, 1U4 IF Amplifier, 1U5 Det-AVC-AF Amp., 3V4 Output

POWER SUPPLY -- 1.5 Volts "A" Supply & 90 Volts "B" Supply RATING--235MA@1.5Volts DC & 11.5MA@ 90Volts DC
TUNING RANGE--BROADCAST 550KC - 1620KC

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to chassis.	455KC (400~ Mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	Loop	1600KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	"	1400KC	Tune to 1400KC signal.	"	A6	"
4.	"	"	600KC	Tune to 600KC signal.	"	A7, A8	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang.

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PARTS LIST AND DESCRIPTIONS

BAGPIPER
MODEL SKR101

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	1R5	
V2	IF Amplifier	1U4	
V3	Det-AVC-AF Amp.	1U5	
V4	Output	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Bagpiper PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	8	150	CE23	PRS150V8	BR815	TC41	TD-8-150	FM-1508	TVA-1405

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Bagpiper PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	20000		CC33	BPD-02	DD-203	K085	817-02	PT412	5HK-S2	
C3	50		CC22	NP0-S150	TCZ-50	Z034	NP0-338-500	ZT-545	5TCC-Q5	
C4A	150		†UB3	†PA-136	†PC-160	G046	811-151	UC-5315	†DP-1	
B	2000					K072	801-002	DC522		
C	10000					K082	811-01	DC511		
D	150					G046	811-151	UC-5315		
E	5000					K080	811-005	DC525		
C5	2000		CC32	BPD-002	DD-203	K072	801-002	DC522	5HK-D2	
C6	2000		♦EX8	BPD-002	DD-202	K072	801-002	DC522	5HK-D2	

† Items C4A, C4B, C4C, C4D, C4E, R5A, R5B, R5C and R5D are combined in one unit.
♦ Items C6 and R3 are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Bagpiper PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	RV31	AB-70	A47-1Meg-Z	Q13-137	U53	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	KB-2	SWE-20	76-2	US-27	Attach to R1A

RESISTORS

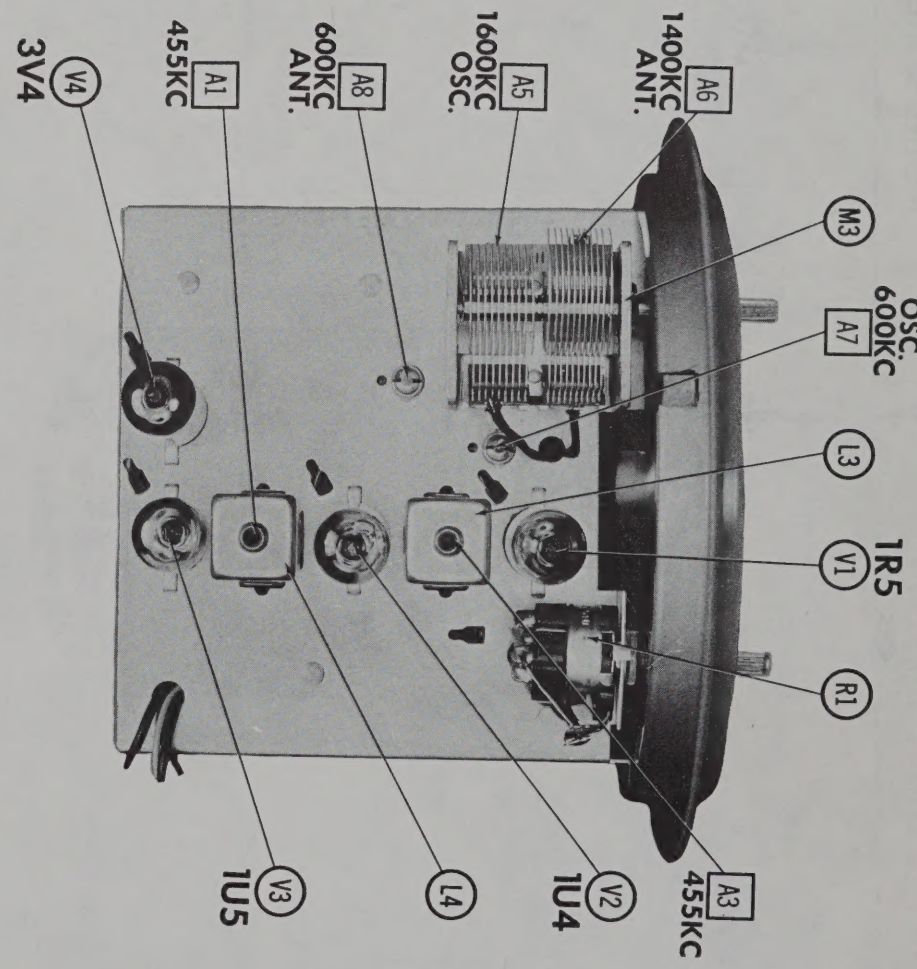
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Bagpiper PART No.	IRC PART No.	
R2	100K		RC14	BTS-100K	
R3	22K		♦EX8	BTS-22K	
R4	3.3Meg		RC20	BTS-3.3Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Bagpiper PART No.	IRC PART No.	
R5A	10Meg		†UB3	BTS-10Meg	
B	4.7Meg			BTS-4.7Meg	
C	1Meg			BTS-1Meg	
D	3.3Meg			BTS-3.3Meg	
C6	330Ω		RC66	BTS-330	

♦ Items R3, C6 are combined in one unit.
† Items R5A, R5B, R5C, R5D, C4A, C4B, C4C, C4D and C4E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Bagpiper PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	8K	3-4Ω	TA14	Z1110	A-2927	A-3329	24S49	S-8X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Bagpiper PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	SP11	4A07 ①	223S1 ①	① Trim edge to fit.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Bagpiper PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	2Ω	9Ω	TR22				
L2	Osc. Coil	1.8Ω	5.5Ω	LR7				
L3	Input IF	18Ω	18Ω	TR21	16-6758	BC-352	12-C1	
L4	Output IF	18Ω	18Ω	TR21	16-6758	BC-353	12-C2	

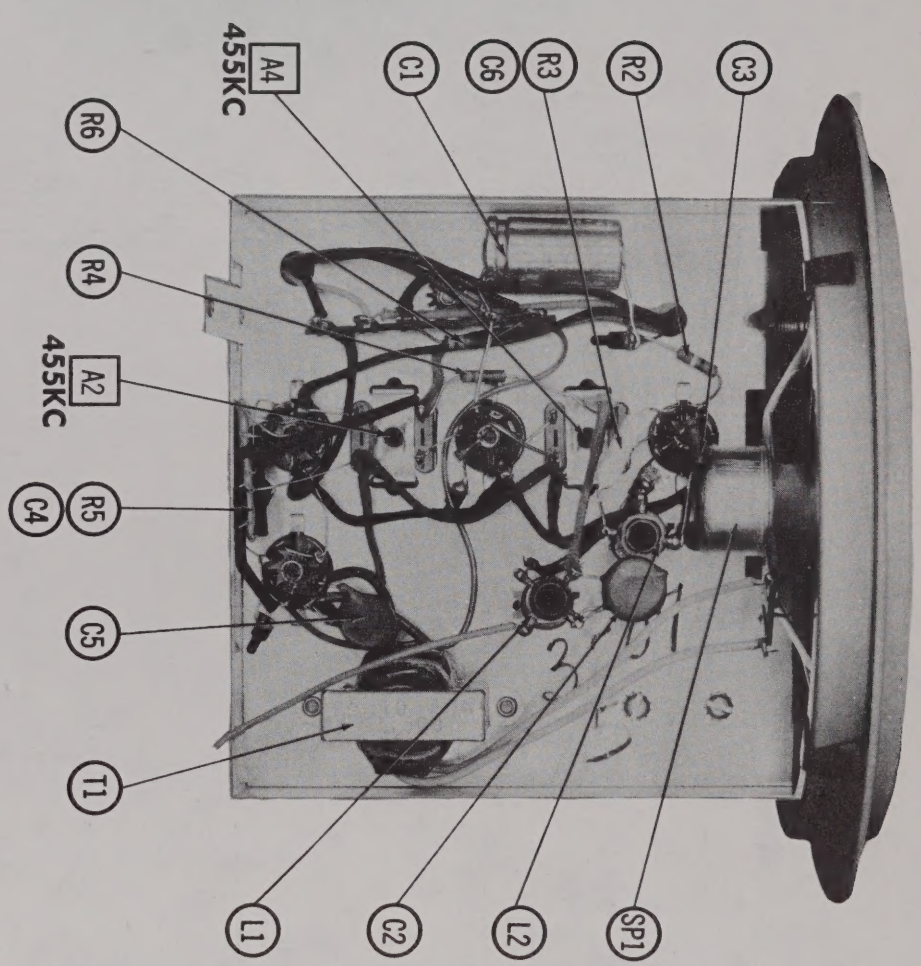
BATTERIES

ITEM No.	VOLTAGE	Bagpiper PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1	1.5V "A"		W353			2F			
M2	90V "B"			490			N-60		

MISCELLANEOUS

ITEM No.	PART NAME	Bagpiper PART No.	NOTES
M3	Tuning Cap.	PR-410-CV21	2 Gang (13-285MMF, 16-130MMF)
	Cabinet	UB2-2	Less Handle & Lid
	Handle	UB2-3	Includes Hardware & Retaining Knobs
	Kit	HK1	Complete Parts & Instructions To Replace Lid & Grille
	Knob	KB49	(On-Off-Volume) & Tuning
	Antenna	EA20	Telescoping Whip

CHASSIS—BOTTOM VIEW



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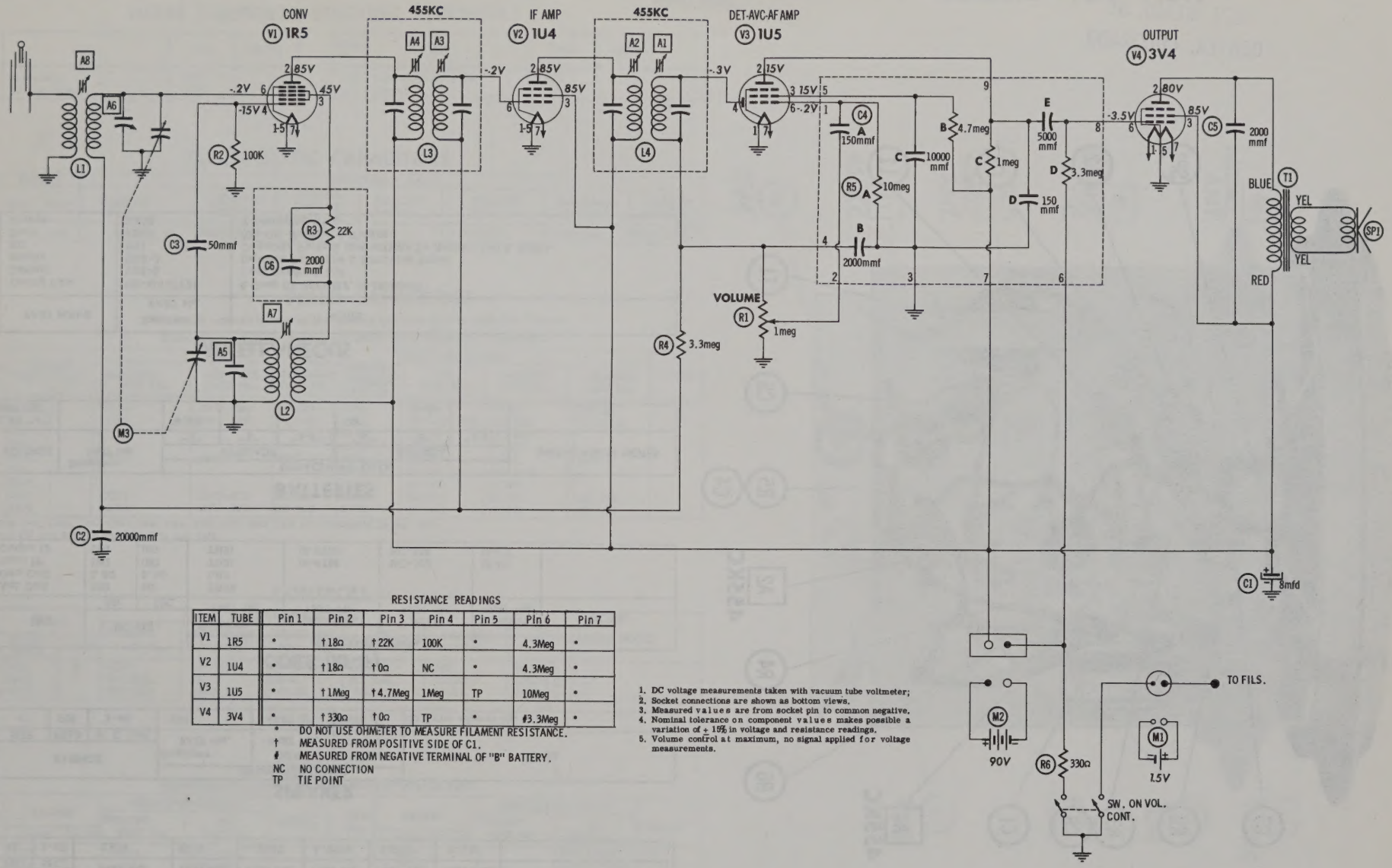

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1R5	•	†18Ω	†22K	100K	•	4.3Meg	•
V2	1U4	•	†18Ω	†0Ω	NC	•	4.3Meg	•
V3	1U5	•	†1Meg	†4.7Meg	1Meg	TP	10Meg	•
V4	3V4	•	†330Ω	†0Ω	TP	•	#3.3Meg	•

• DO NOT USE OHMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM POSITIVE SIDE OF C1.
# MEASURED FROM NEGATIVE TERMINAL OF "B" BATTERY.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter;
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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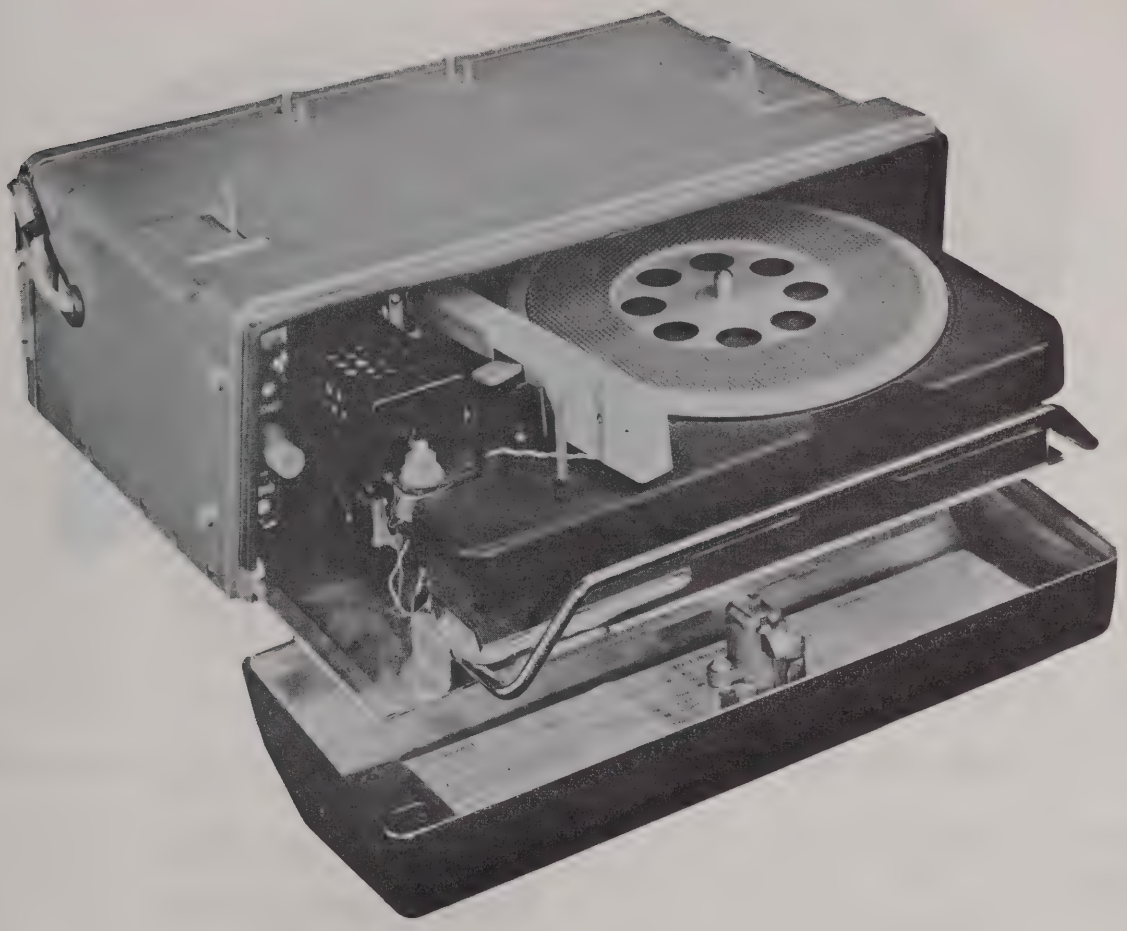
CHRYSLER
MODEL "Highway Hi Fi"



CHRYSLER
MODEL "Highway Hi Fi"

GENERAL INFORMATION

The "Highway Hi Fi" is designed to play at the speed of 16 2/3 RPM, half that of the L. P. record, and employing 550 grooves per inch twice that of the L. P. record. The new player requires a 0.25 mil radius stylus as compared to the 1 mil stylus used with the present L. P. players.

The record player is mounted in a compact metal case under the dashboard of the car. A new 7 inch, extra long playing (XLP) record is used. The new record provides up to 45 minutes of music or one hour of speech on each side.

The audio section of the automobile radio is used with the player. A switch on the phonograph permits selections of radio or phono operation.

Chrysler Corporation
Detroit, Michigan

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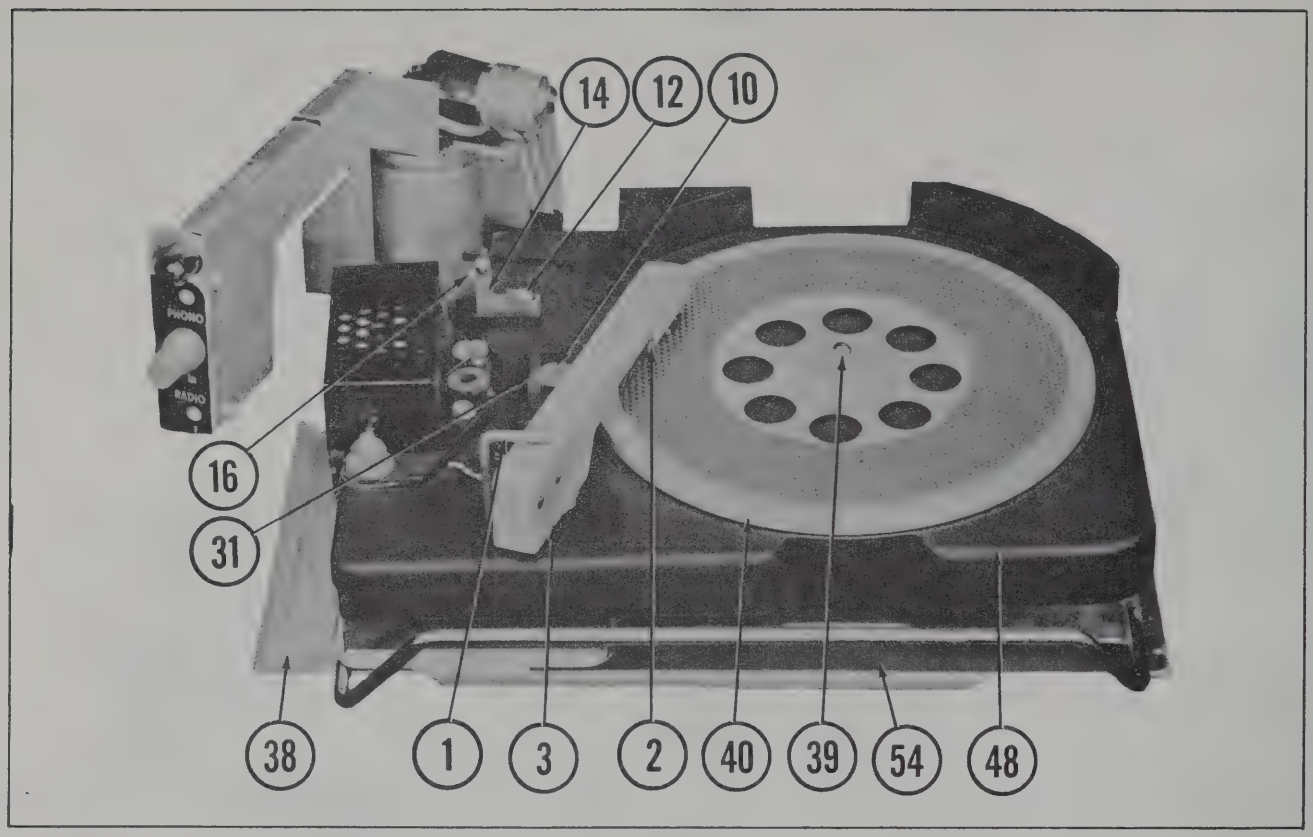


FIGURE 1

SPECIFICATIONS

Speed: 16 2/3 R. P. M.

Stylus Radius: 0.25 - Mil

Stylus Pressure: 2.5 Grams

Voltage: 12 volts

Cartridge Output: Substantially uniform from 50 to 10,000 cps.

Record: 7 inch, extra long playing record.

Record Time: 45 minutes music or one hour speech on each side.

OPERATING INSTRUCTIONS

Loading-

1. Pull unit out until it stops. Push up red knob from Radio to Phono position.

2. A curved ridge, the same radius as the record, is located behind the turntable spindle (39). The record is placed against this ridge and then drop in place on the turntable.

Starting-

To start the record, press a red tab (10) protruding from the left side of the pickup arm (3), thus disengaging the arm from its resting place, and move the arm inward until it hits a stop. Now the pickup automatically sets down on the lead-in grooves of the record, and the turntable starts to rotate automatically.

NOTE: Always place tone arm in off position when phonograph is not in use.

ADJUSTMENTS

Removing Mechanism From Case-

1. Remove vibrator.

2. Pull phono out of case as far as it will go.

3. Remove five screws (four on side, one on rear) fastening control chassis and cable clamp to case.

4. Release cable with enter side of case by pushing grommet back into larger hole.

5. Remove sheet metal screws fastening ground lead to underside of slide assembly (38).

6. Pull slide latch lever on underside of slide assembly (38).

7. To replace unit in case reverse the above procedure.

Adjusting The Tone Arm Stop (14)-

1. To adjust the tone arm stop loosen screw (12) and move the stop (14) until the stylus sets down properly at the start of the record.

Stylus Pressure Adjustment-

The stylus pressure should be 2.5 grams measured by a gram gauge. The gram gauge is placed under the cartridge, close to the stylus, and raise the

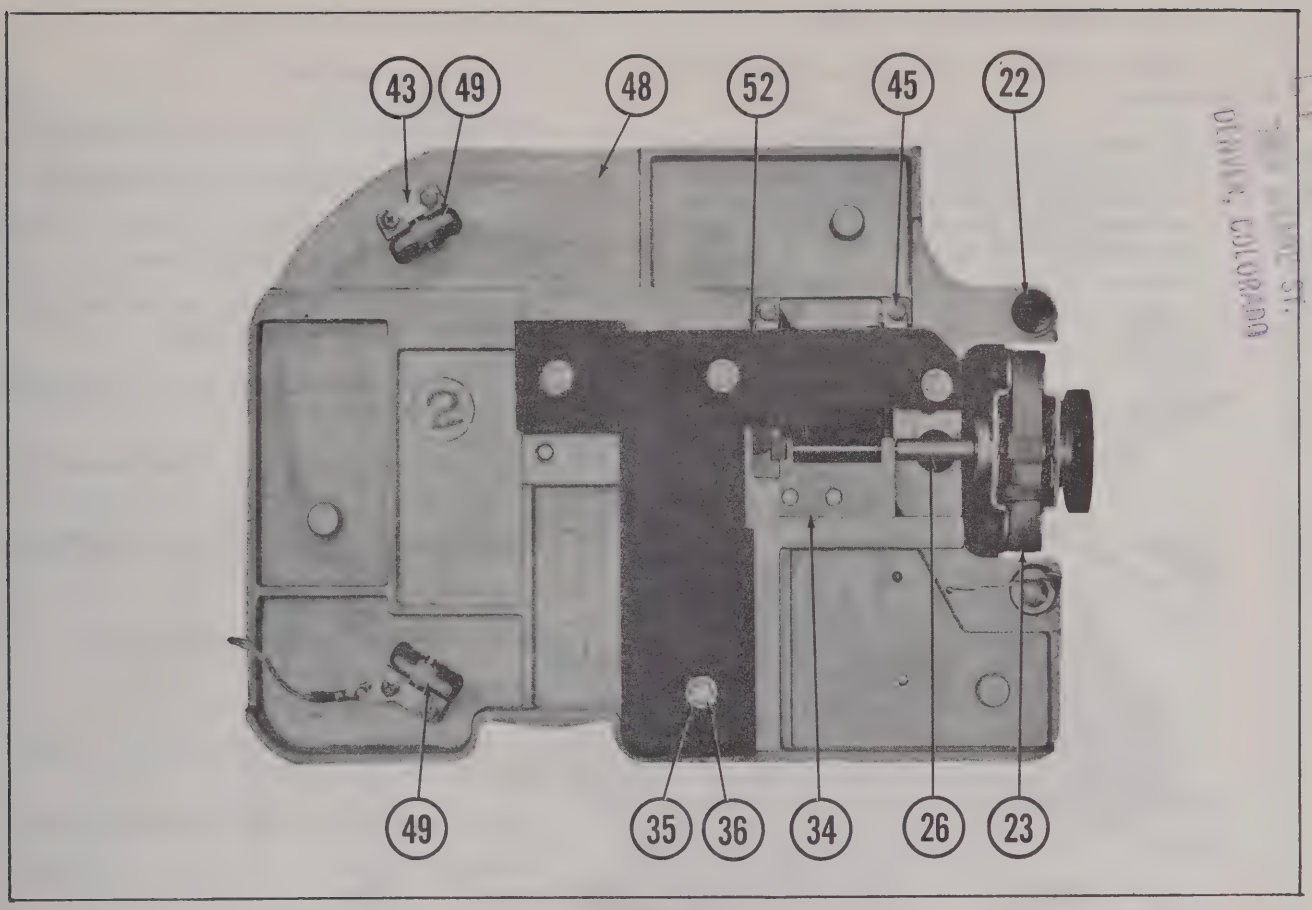


FIGURE 2

gauge until the center of the front cartridge - mounting screws is in line with the lower edge of the tone arm. If the pressure of the stylus is not correct see that the pickup leads are not interfering with the movement of the rocker arm (10). To adjust stylus pressure grasp the short end of the pressure spring (10A) which hook over the side of the rocker arm (10), and pushing it toward, or pulling it away from, the rocker arm pivot pin. This should be done with a pair of needle-nose pliers.

The Tone Arm Indexing Latch Adjustment-

1. The tone arm indexing latch is adjusted by loosening a small lock nut (15) and inserting a #3 Allen wrench in the set screw (16), and turning screw in or out to raise or lower the latch.

2. To check the latch for proper height, depress the red tab on the side of the tone arm and move the arm out of the rest position. The latch should stop the tone arm; if not, the latch must be lowered.

3. Release the red tab (10) to see if the arm clears the latch. If it does not, the latch must be raised.

NOTE: When replacing any part of the tone arm or rocker arm, other than the stylus, the tone arm and rocker arm balance must be check.

Balancing Tone Arm-

1. Check to see that tone arm is properly assembled, with pickup leads attached and clip used to protect stylus removed.

2. Place tone arm on 5/64" drill bit, hold bit by one end, if the tone arm seeks a position no balancing is needed.

3. The tone arm balance is obtained by drilling out part of the counterweight (at rear of tone arm). If necessary add solder for balance. The tone arm should seek a position and remain there when properly balanced.

Replacing Stylus-

Remove the limit arm (1), and swing tone arm to right until the pick-up cartridge is clear of motorboard. Supporting the tone arm with one hand, grasp outer edges of small metal clip on which stylus is mounted, between thumb and forefinger. Pull clip down and forward out of cartridge. Insert new stylus and push clip into cartridge until it snaps firmly in place.

Replacing Cartridge-

1. Remove tone arm.

2. Remove rocker arm (10).

3. Remove the two screws (5 and 6) fastening cartridge to rocker arm.

4. Position new cartridge in rocker arm, and replace the screws (5 and 6). One screw is slightly shorter than the other. This screw goes in hole near front of cartridge. Place small drop of glyptal on ends of screws.

5. Check balance of rocker arm (10).

6. Install rocker arm in tone arm and check stylus pressure.

NOTE: If rocker arm requires rebalancing in step 5, the tone arm balance should also be checked. If installation of new cartridge does not disturb rocker arm balance, it is not necessary to check tone arm balance.

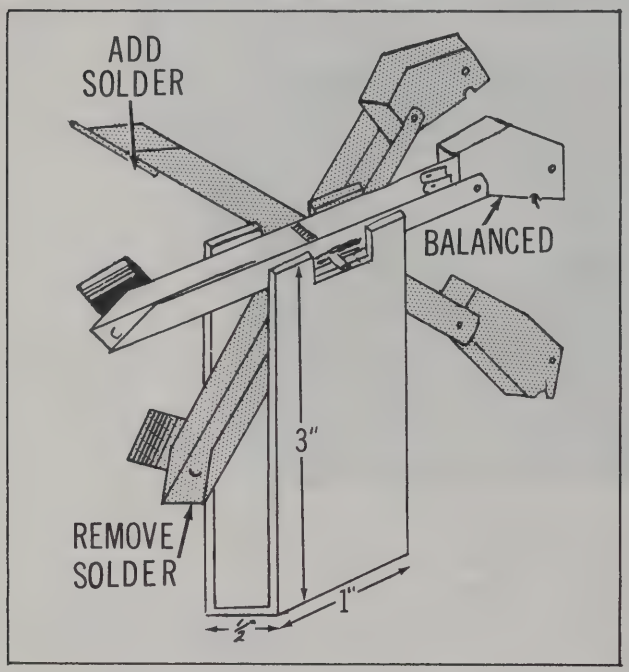


FIGURE 3

Rocker-arm balancing fixture. A business cord folded in a "U", and held in the hand, can be used to check the rocker-arm balance if a metal fixture is not available.

Balancing Rocker Arm (10)-

The two nylon bearings (2) should be the balancing point of the rocker arm (10). The rocker arm (10) can be balanced by adding solder in the center of the lock-washer riveted to one end of the rocker arm or removing solder with a file. Proper balance of arm is indicated when the arm seeks and remains in a horizontal position (See Figure 3).

NOTE: Place a spare pick-up lead clip, without leads, on each cartridge terminal when checking rocker arm balance.

TROUBLES

Turntable Revolve When Tone Arm Is In Rest Position-

1. Spring for idler lifter crank (41) is too tight causing crank to bind.

2. Idler lifter crank bent out of shape. Remove and straightening out to the desired shape.

Stylus Jumps Or Skips Grooves When Car Is Moving-

1. Stylus pressure not great enough.

2. Stylus defective.

3. Rocker arm not balanced.

4. Unbalance tone arm.

5. Pivot of tone arm not properly lubricated.

Tone Arm Does Not Set Down On Start Of Record-

1. If stylus sets down before or after the lead-in grooves on record, adjust tone arm stop.

2. Arm does not stop when red tab (10) is depressed and arm is moved to the right:

(a) Lower indexing latch set to high. Lower latch by adjustment screw (16).

(b) Red tab on cartridge rocker assembly is bent.

When Car Is In Motion Stylus Skates Across Record-

1. Tone arm unbalanced.

2. Improperly lubricated tone arm pivot.

Speed Of Turntable To Slow-

1. Vibrator Defective. Determine cause of failure before replacing vibrator.

2. Motor coupling sleeve (26) not properly seated.

3. Grease or oil on rubber idler or turntable drive wheel.

4. Motor leads open.

5. Motor defective. Half of winding open.

Stylus Fails To Track Properly Or Sticks Partially Through Record-

1. Tone arm prevented from moving because of pickup leads improperly dressed.

2. Stylus broken or worn.

3. Stylus pressure not great enough.

4. Improperly lubricated tone arm pivot or dirty.

Distorted Audio Output-

1. Stylus Worn.

2. Pickup cartridge defective.

3. Capacitor 50-50 mfd. open section.

Wow-

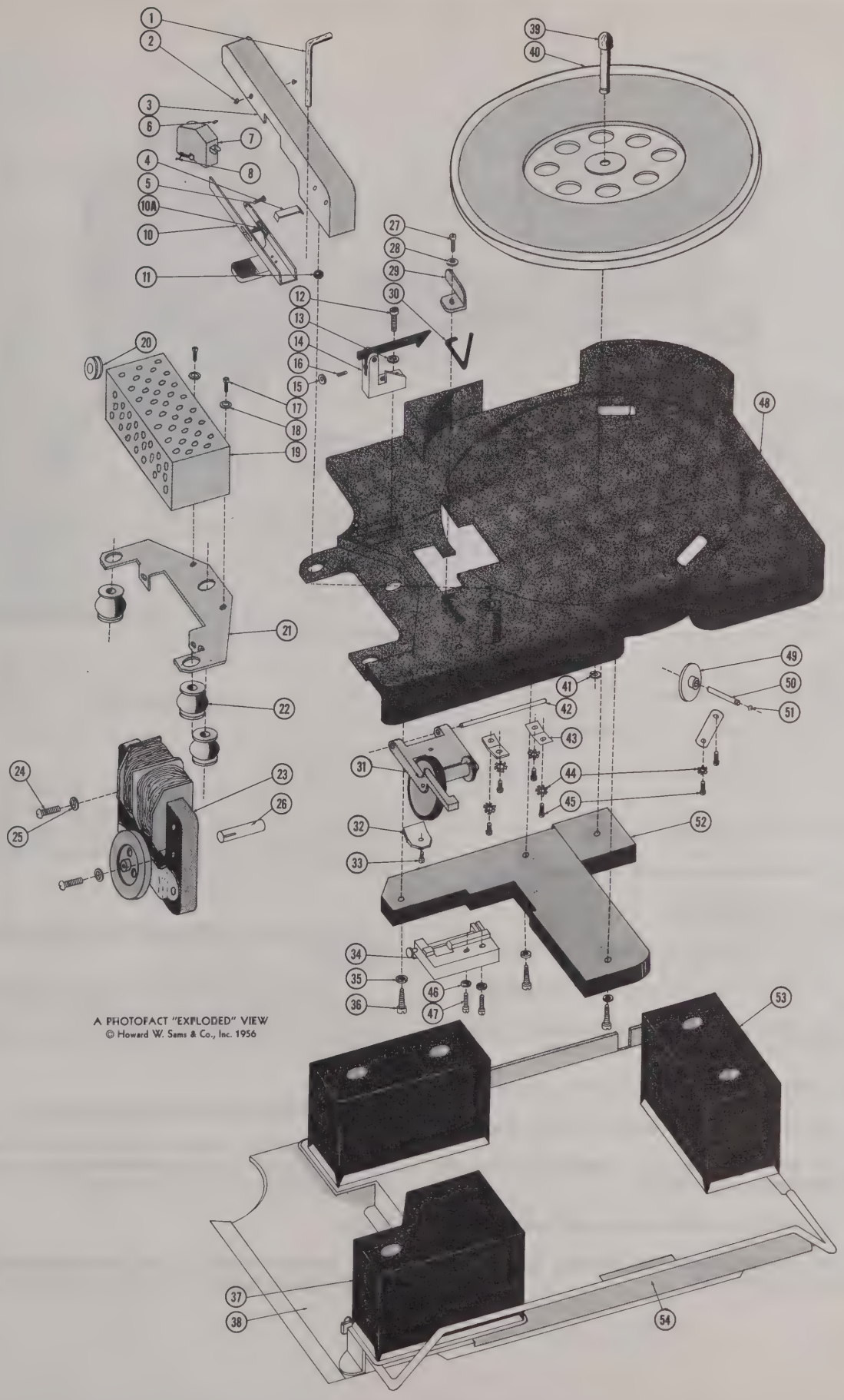
1. Turntable warped.

2. Turntable mat loose.

3. Turntable support idler (49) tight or frozen.

4. Rubber idler wheel (31) flat or a bump on wheel.

5. Rubber idler wheel (31) slipping because of grease or oil.



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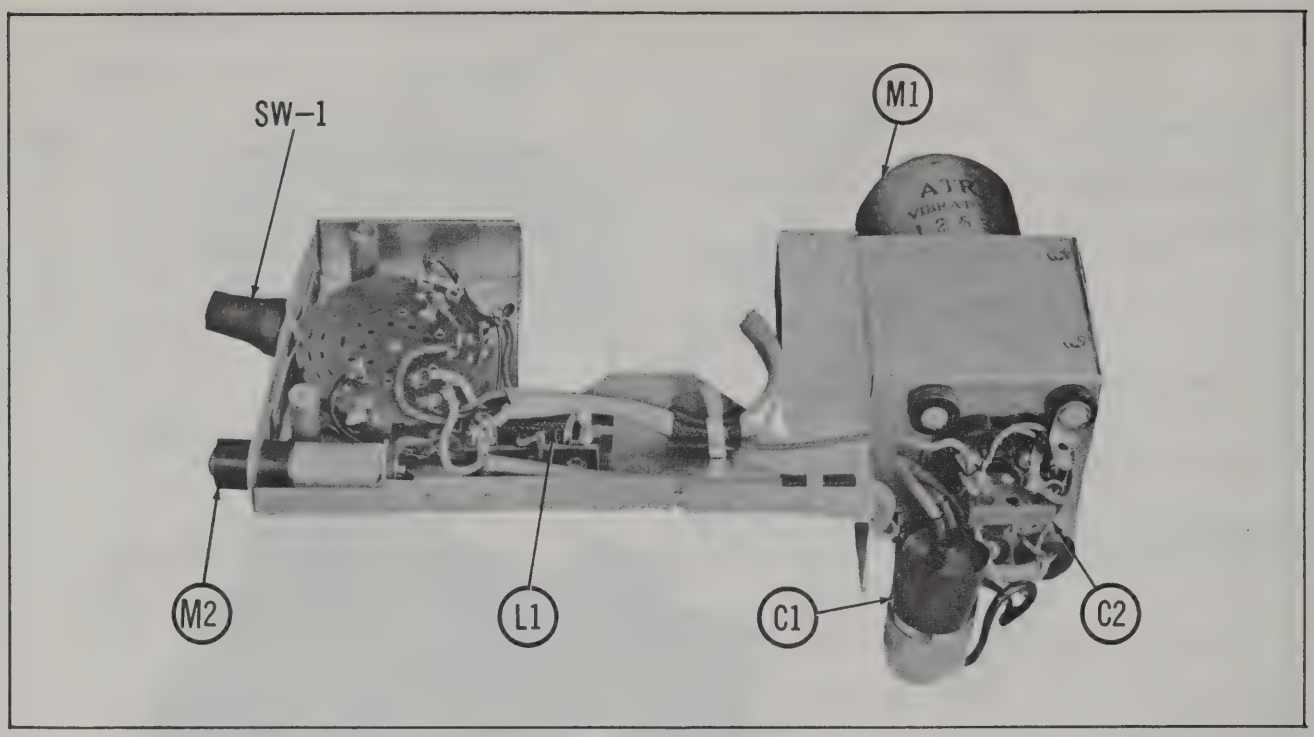


FIGURE 4

6. Oil or grease on turntable drive ring.

Flutter-

1. Bolts used for shipping not removed.

2. Bump or flat spot on rubber idler wheel (49).

3. Motor coupling sleeve (26) not properly seated.

4. Motor flywheel rubbing.

5. Turntable support idler (49) rough.

Turntable Does Not Revolve-

1. If motor flywheel is turning, check for:

(a) Motor coupling sleeve (26) disengaged.

(b) Idler lifter spring (32) too tight, preventing idler wheel from contacting drive shaft.

2. If motor flywheel is not turning, check for:

(a) "Phono-Radio" switch in radio position.

(b) Defective Vibrator. Determine cause of failure before replacing vibrator.

(c) Motor armature or bearing binding.

(d) Coupling sleeve (26) partially disengaged, jamming motor shaft (34).

(e) Lead disconnected on motor should be approximately 18 volts AC.

LUBRICATION

Tone Arm Pivot-

A special lubricant (Part No. 86 000 441) is used on the tone arm pivot and ball bearing (11). In addition to acting as a lubricant, the material damps the lateral movement of the tone arm. Under no circumstances should a substitute be employed.

Turntable Spindle (39) And Turntable Drive Assembly Shaft (42)-

The turntable spindle (39) and the turntable drive assembly shaft (42) should be lubricated with the special lubricant supplied for this purpose (Part No. 86 000 431). Only a very small amount of lubricant is required.

Bearing Block And Drive Shaft Assy. (34)-

The bearing block and drive shaft are self lubricating. Under no circumstances should a lubricant be used on any part of this assembly.

Motor-

The motor bearings are lubricated during manufacture and no further lubrication is required.

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
C1A	26 000 151	Elect. Cap., 50 mfd. @ 25V.			@ 500V.
			L1	15 000 751	R. F. Choke
C1B		Elect. Cap., 50 mfd. @ 25V.	M1	40 000 381	Vibrator
			M2	64 000 151	Pilot Lamp
C2	20 000 091	Mica. Cap., 400 mmf.	SW1	40 000 391	Phono-Radio Switch

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	47 001 431	Limit Arm	28	58 000 520	Washer
2	89 000 321	Tone Arm Bearing (Nylon)	29	47 001 301	Spring For Idler Lifter Crank
3	06 000 012	Tone Arm, with counter weight & pivot	30	47 001 001	Idler Lifter Crank
4	47 000 941	Retaining Clip For Pickup Lead	31	06 000 015	Turntable Drive Assy.
			32	47 001 021	Damping Spring For Shaft (42)
5	56 000 841	Screw, #0-80 x 3/8" Brass For Cartridge	33	56 000 821	Screw, #2-56 x 3/16
6	56 000 731	Screw, #0-80 x 5/16" Brass For Cartridge	34	06 000 016	Bearing Block and Drive Shaft Assy.
7	74 000 521	Pickup Cartridge W/ Stylus	35	58 002 040	Lock Washer #6
8	74 000 522	Stylus For Pickup Cartridge	36	56 051 540	Screw, #6 x 1/2"
9	04 005 961	Pickup Leads Assy.	37	84 000 401	Shock Mount Cushion
10	06 000 025	Rocker Arm Assy.	38	06 000 005	Slide Assembly
11	47 001 292	Ball Bearing For Tone Arm	39	47 000 961	Spindle For Turntable
12	56 025 620	Screw #4-40 x 3/8" for Tone Arm Stop	40	04 005 941	Turntable
			41	53 000 562	Retaining Ring For Spindle (39)
13	58 000 520	Lock Washer			
14	06 000 017	Tone Arm Stop and Indexing Latch	42	47 001 011	Shaft For Turntable Drive Assy.
15	57 000 000	Nut For Set Screw (16) Below	43	40 005 021	Shaft Clamp For (42)
16	56 072 490	Set Screw For Tone Arm Indexing Latch	44	58 001 000	Lock Washer #4
			45	56 021 750	Screw, #4-40 x 1/4"
17	56 025 840	Screw, #6-32 x 1/4", For Motor Cover	46	58 000 141	Lock Washer
			47	56 008 360	Screw, #4-40 x 3/8"
18	58 000 540	Lock Washer #6	48	48 000 161	Motorboard Casting
19	47 001 151	Motor Cover	49	89 000 341	Turntable Support Idler Wheel (Nylon)
20	83 000 241	Grommet for Motor Cover			
21	47 001 271	Motor Bracket	50	47 001 121	Shaft For Idler Wheel
22	84 000 391	Rubber Motor Mount	51	53 000 561	Retaining Ring
23	06 000 018	Motor	52	48 000 201	Ballast Weight
24	56 021 910	Screw #5-40 x 1/2"	53	84 000 411	Shock Mount Cushion (2 Used)
25	58 000 530	Lock Washer			
26	47 001 345	Coupling Sleeve For Motor	54	47 001 231	Record Storage Press Plate
27	56 000 781	Screw #4-40 1/4"			

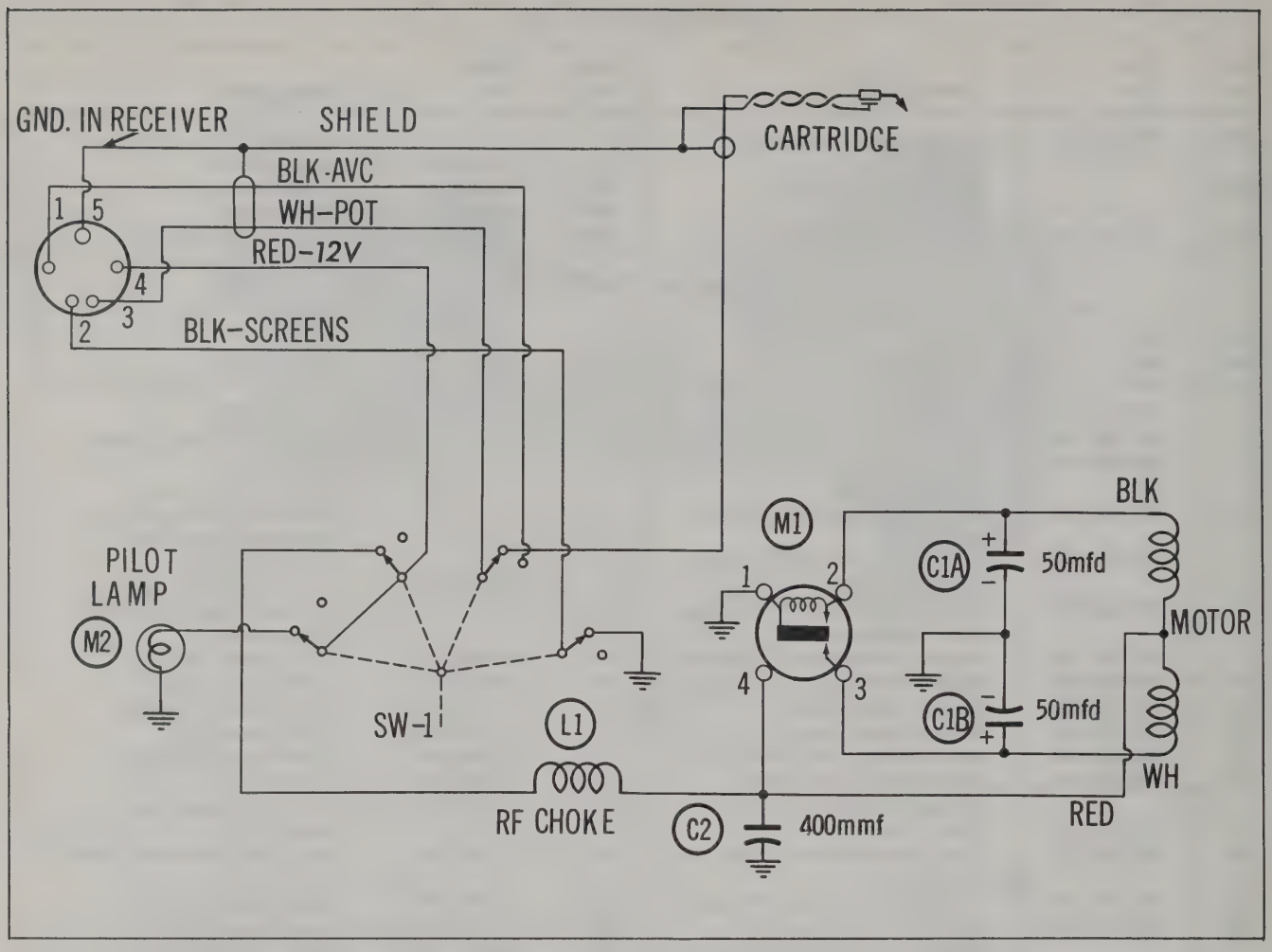
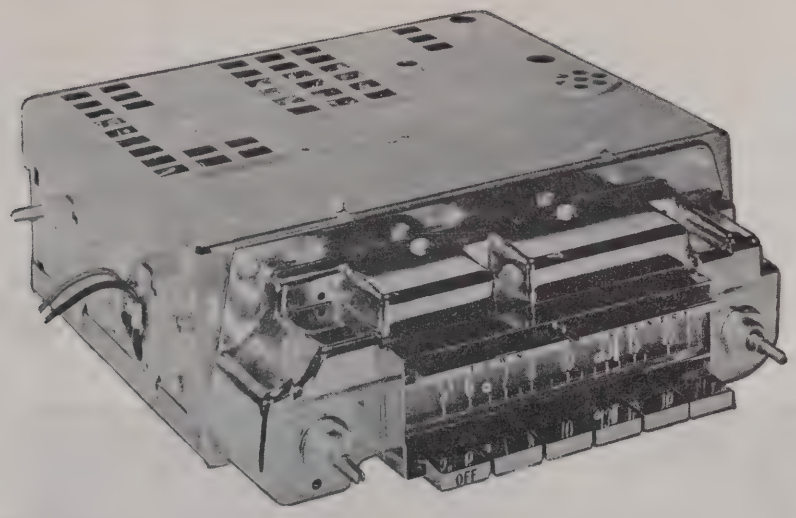

GND. IN RECEIVER
SHIELD
CARTRIDGE
BLK-AVC
WH-POT
RED-12V
BLK-SCREENS
1
5
4
3
2
PILOT LAMP
M2
SW-1
L1
RF CHOKE
C2
400mmf
M1
1
2
4
3
C1A
50mfd
C1B
50mfd
BLK
MOTOR
WH
RED

FIGURE 5

CONTINENTAL
MODEL 6BC (4047424)



TRADE NAME	Continental Model 6BC (4047424) (For 1956 Continental Automobiles)
MANUFACTURER	Bendix Radio, Div. of Bendix Aviation Corp., Baltimore 4, Md.
TYPE SET	Battery Operated Custom Built AM Superheterodyne Automobile Receiver
TUBES (Nine)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12AU6 IF Amplifier, 12AX7 Det.-AF Amplifier, 12AU7 Phase Inv. -Relay Control , (2) 12AQ5 Output, 12AV6 AVC-Trigger Amp., 12X4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 4 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Fig. 1	Thru dummy to antenna receptacle.	265KC (400\Mod)	650KC	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1605KC	High freq. end of dial	"	A5, A6, A7	"
3.	With radio installed in car and antenna fully extended, tune in a weak station near 1600KC, adjust A7 for maximum volume.						
	Following steps are necessary only in case of core or tuning coil replacement.						
4.				High freq. end of dial	Across voice coil	A8, A9, A10	Adjust tuner cores so that they remain in coil forms but out of coils.
5.	Fig. 1	Thru dummy to antenna receptacle	1605KC	"	"	A5, A6, A7	Adjust for maximum output in order given.
6.	"	"	1200KC	1200KC	"	A10, A9, A8	"
7.	"	"	1605KC	High freq. end of dial	"	A5, A6, A7	Adjust for maximum output in order given. Repeat steps 6 and 7, but adjust A8, A9, A10 at 1200KC only.

PUSHBUTTON ADJUSTMENTS

Pull pushbutton all the way out. Manually tune to desired station. Press pushbutton in firmly. Repeat on remaining pushbuttons.

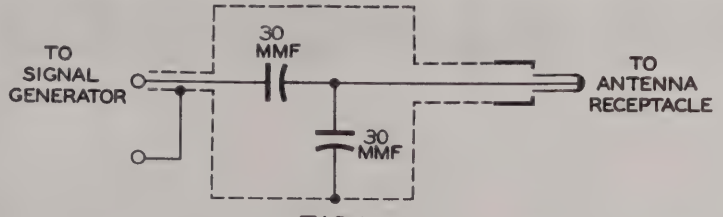


FIG. 1

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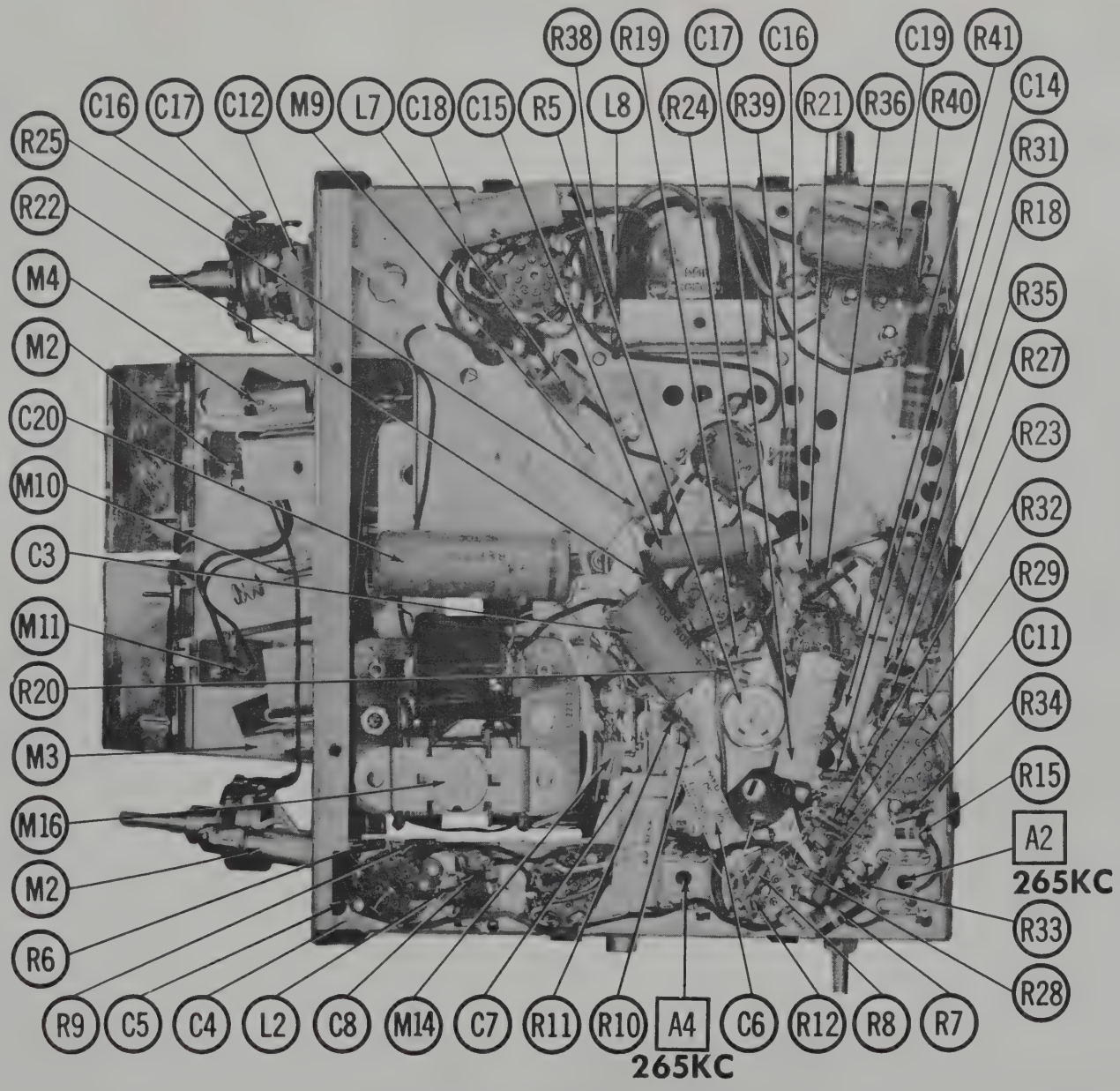


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12AU6	
V4	Detector-AF Amplifier	12AX7	
V5	Phase Inv.-Relay Cont.	12AU7	

ITEM No.	USE	TYPE	NOTES
V6	Output	12AQ5	
V7	Output	12AQ5	
V8	AVC-Trigger Amplifier	12AV6	
V9	Rectifier	12X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BENDIX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲20	350	(Note 1)	AFH4-99-95				Q-205	R2258 *
B	■10	300						MT-4540	
C	▲40	350							
D	20	25							TVA-1611
C2	40	350							R2257 *
C3	20	30	(Note 2)	PRS25VAC20	BR505 † BR505			MT-0250 † MT-0250	

Note 1. In some versions C1A is 40MFD.
Note 2. C3 is a non-polarized unit.

* Non-catalog item.
† Connect negative leads together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

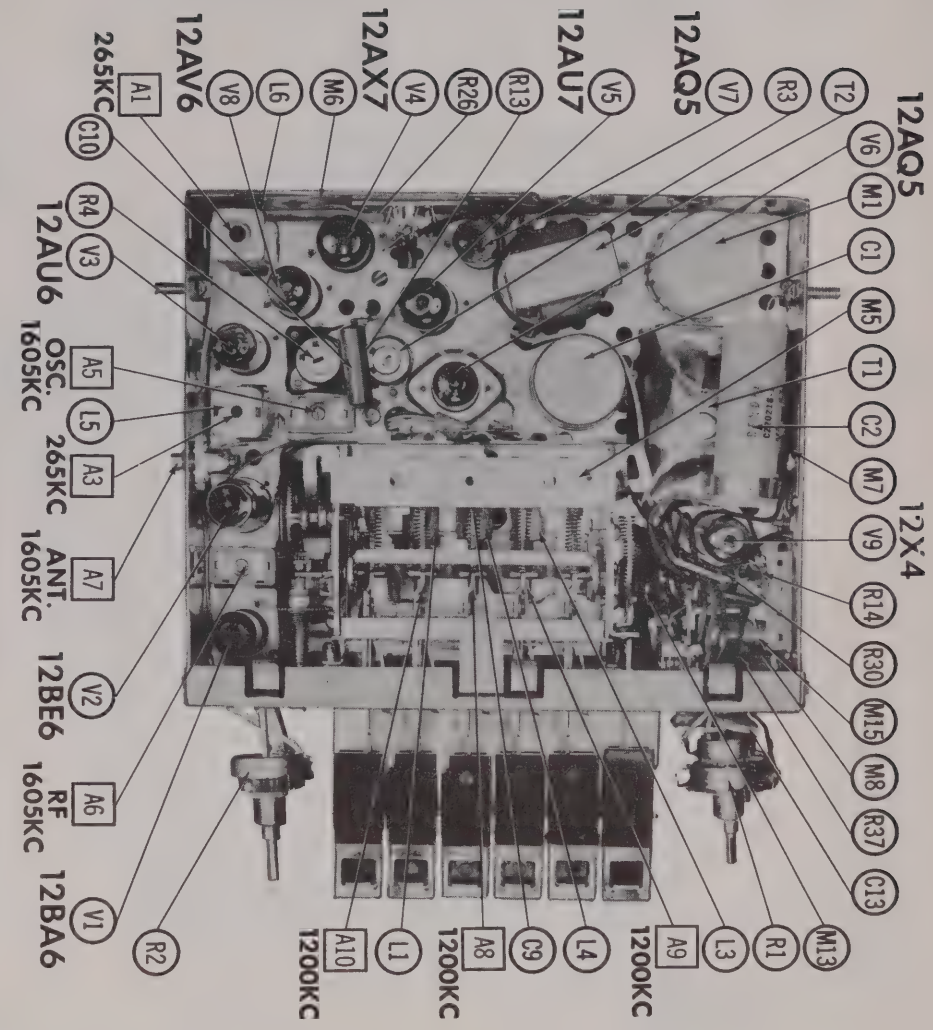
ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA BENDIX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	120			NP0-D1120	TCZ-120	22R5T12	NP0-333-121		MS-312	
C5	100			S1100	D6-101	TP34	GP1K-101		5GA-T1	
C6	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C7	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C8	10			NP0-D10	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C9	100			N750-D100	TCN-100	TN22	N750L-101	NT-531	5TCU-T1	
C10	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C11	150			S1150	D6-151	TP36	GP2K-151	UC-5315	5GA-T15	
C12	.005	200		BPD-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	Note 3
C13	3600			BPD-004	D6-402	K078	811-004	UC-5240	5GA-D39	Note 4
C14	.0068	200		BPD-0068	D6-682	CUB6D68	GP3-333-682	PT628	6TM-D68	
C15	.02	400		BPD-02	DF-203	CUB4S2	817-02	PT412	4TM-S2	
C16	.02	200		BPD-02	DF-203	CUB2S2	817-02	PT412	2TM-S2	
C17	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C18	.008	1600		P1688N-008	DD16-802	CUB16D8		PT1628	16TM-D8	
C19	.5	100		VHC36				RF480	68P20	
C20	.3	600								

Note 3. Some versions may use .0068 MFD in this application.
Note 4. Some versions may use .0012MFD in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA BENDIX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	Switch		L219669-2					Tone switch (Panel)
B	1Meg	½						Volume-tapped @ 250K (rear)
R2	11.5Ω	2	OC219659-4					Fader- wire wound
R3	3000Ω	2			39-3000		FL-4K	Listen sensitivity - wire wound
R4	3000Ω	2			39-3000		FL-4K	Seeking sensitivity - wire wound
R5	3000Ω	2			39-3000		FL-4K	AVC Delay - wire wound

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BENDIX PART No.	IRC PART No.	
R6	1Meg			BTS-1Meg	
R7	15K	2		BTB-15K	
R8	2.2Meg			BTS-2.2Meg	
R9	1Meg			BTS-1Meg	
R10	47K			BTS-47K	
R11	68Ω			BTS-68	
R12	68Ω			BTS-68	
R13	2700Ω			BTS-2700	Note 1
R14	15K			BTS-15K	
R15	470K			BTS-470K	Note 2
R16	82K			BTS-82K	
R17	33K			BTS-33K	Note 3
R18	15Meg			BTS-15Meg	
R19	10Meg			BTS-10Meg	
R20	220K			BTS-220K	
R21	220K			BTS-220K	
R22	470K			BTS-470K	
R23	470K			BTS-470K	
R24	3300Ω	1		BTA-3300	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BENDIX PART No.	IRC PART No.	
R25	330Ω	1		BTA-330	
R26	1000Ω			BTS-1000	
R27	33Ω			BTS-33	
R28	2.2Meg			BTS-2.2Meg	
R29	10Meg 5%			BTS-10Meg 5%	
R30	33K	2		BTB-33K	
R31	1Meg			BTS-1Meg	
R32	2200Ω			BTS-2200	
R33	150K			BTS-150K	
R34	8.2Meg 5%			BTS-8.2Meg 5%	Note 4
R35	2.2Meg			BTS-2.2Meg	
R36	100Ω	1		BTA-100	Note 5
R37	12K	2		BTB-12K	
R38	2200Ω	1		BTA-2200	
R39	1000Ω	1		BTA-1000	
R40	180Ω	1		BTA-180	
R41	180Ω	2		BTB-180	

Note 1. Not used in some versions.
Note 2. Some versions use 100K in this application.
Note 3. Some versions use 56K in this application.
Note 4. This resistor may be any 5% value between 6.8Meg and 10Meg. For replacement, use value listed.
Note 5. Some versions use 560Ω in this application.

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	BENDIX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12.6VAC @ 2.3A	530VCT @ .065A			C282975-2	V3903	P-2978	P-6489	22R52	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	BENDIX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	9.7K	3-4Ω	C291798-2	Z1000	A-2938	A-3850	24S60	S-17X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	BENDIX PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5" x 7"	PM	3-4Ω	N222097-1	57A1	23381	
SP2	6" x 9"	PM	3-4Ω		69A2	23851	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	BENDIX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	12Ω						Part of M5
L2	RF Choke	30Ω					4652 *	1090 Microhenries, wound on 15K, 1 watt resistor
L3	RF Coil	12Ω						Part of M5
L4	Osc. Coil	.5Ω	2.9Ω					Part of M5
L5	Input IF	55Ω	44Ω	L291806-1			12-H1	
L6	Output IF	40Ω	35Ω	L291807			12-H6	
L7	Fil. Choke	.4Ω						118 Microhenries
L8	Vib. Hash Choke	.4Ω						14 Microhenries

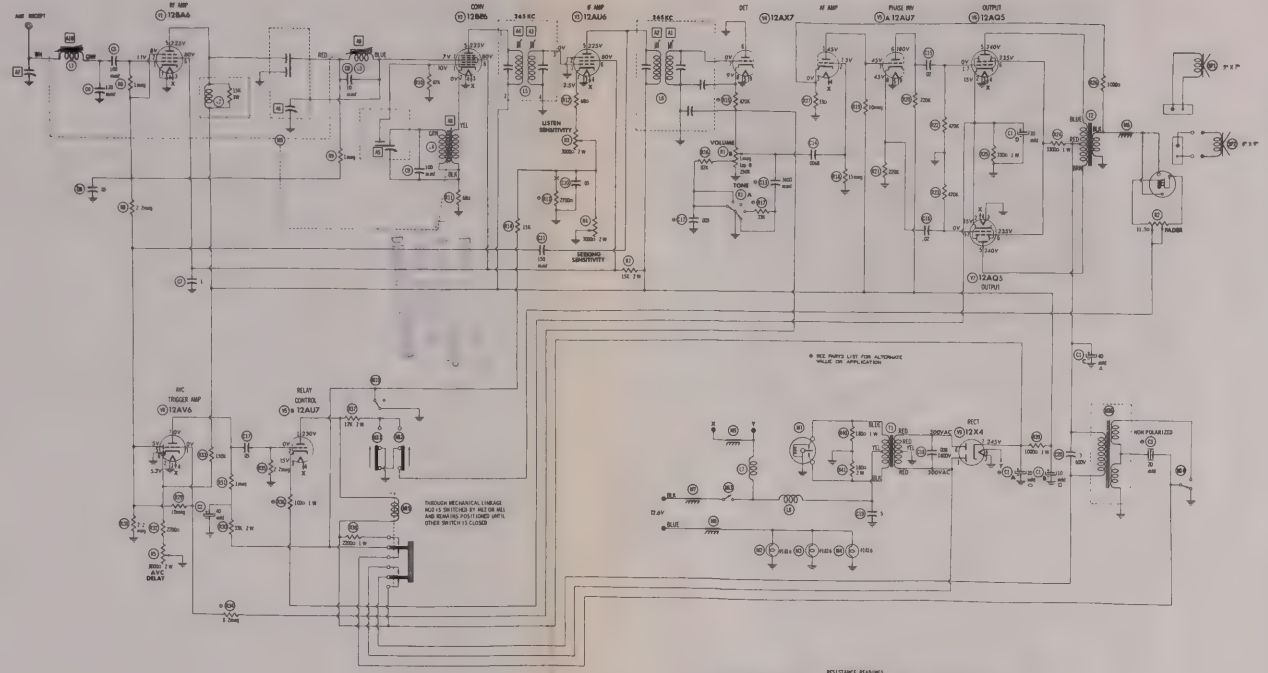
* Parallel with 15K, 1 watt resistor.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				BENDIX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12.6V	115∿	C221139-1	6330	G883	6330	

MISCELLANEOUS

ITEM No.	PART NAME	BENDIX PART No.	NOTES
M2	Dial Light		#1816
M3	Dial Light		#1816
M4	Dial Light		#1816
M5	Tuner	220961-1	Permeability, includes L1, L3, L4
M6	Spark Plate		Speaker
M7	Spark Plate		Power input lead
M8	Spark Plate		Dial light lead
M9	Spark Plate		Filament
M10	Switch		Seeking sensitivity (SPDT)
M11	Switch		Seek Bar (SPDT-Slide Type)Country
M12	Switch		Seek Bar (SPDT-Slide Type) Town
M13	Switch		Off(Power) DPDT
M14	Switch		Motor reversing (SPDT)
M15	Relay		
M16	Motor	L221137-1	Includes field coil and shading coils
A5	Trimmer Cap.	L219090-2	Osc. (315-385MMF), also includes 100MMF fixed capacitor
A6	Trimmer Cap.	L219090-1	RF (5-80MMF), also includes 22 and 270MMF fixed capacitors
A7	Trimmer Cap.	C219083-1	Ant. (4-75MMF)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BA6	5Meg	4Meg	1Ω	0Ω	1100Ω	1.1M	0Ω		
V2	12BA6	47K	68Ω	1Ω	0Ω	1100Ω	1.1M	5Meg		
V3	12AU6	68Ω	0Ω	0Ω	1Ω	1180Ω	1.1M	3700Ω		
V4	12AX7	1.0Meg	1.5Meg	33K	1Ω	0Ω	0Ω	39Ω	1Meg	NC
V5	12AU7	1.6MΩ	2.2Meg	430Ω	1Ω	33Ω	1.2K	1.1Meg	220K	NC
V6	12AQ5	470K	330Ω	0Ω	1Ω	1.4KΩ	390Ω	470K		
V7	12AQ5	470K	330Ω	0Ω	1Ω	1.3KΩ	390Ω	470K		
V8	12AV6	5.1Meg	330Ω	0Ω	1Ω	2.2Meg	0Ω	1Meg		
V9	12AU7	3MΩ	1P	0Ω	1Ω	1P	270Ω	1M		

1 MEASURED FROM PIN 7 OF V9
NC NO CONNECTION
TP TIE POINT

1 DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 cycles per sec.
2 Tube socket voltages measured with no signal applied.
3 Measured to B- at wire number put in common negative.
4 Battery voltage maintained at 13 volts for voltage readings.
5 Receiver tuned to 2 meters and volume control adjusted for maximum of 1.75 V. output and resistance readings.
6 Tubes tested on mutometer, no signal applied for voltage measurements.

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CORONADO MODEL
TV1-9305A (Code 17T24)

TRADE NAME	Coronado Model TV1-9305A (Code 17T24)
SUPPLIER	Gamble-Skogmo, Inc., 15 N. 8th. St., Minneapolis, Minn.
TYPE SET	Television Receiver
TUBES	Fifteen
POWER SUPPLY	105-115 Volts AC-60 Cycle RATING 1.13 Amp. @ 115 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.75MC, Sound IF 21.25MC (Intercarrier)

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from top panel of cabinet.

2. Remove 5 metal screws. Remove rear cover.

3. Place receiver with rear side up on a soft surface.

4. Remove 2 metal screws holding AC interlock-antenna bracket and remove.

5. Remove 2 chassis mounting screws from bottom side of cabinet. Return receiver to normal upright position.

6. Disconnect speaker leads and picture tube socket.

7. Remove ion trap and remove wing nut from top of yoke and remove yoke from picture tube neck.

8. Remove chassis screws on each side of cabinet.

9. Remove chassis by pulling bottom out first (with the right side on an angle toward the back) from cabinet.

10. Remove 2 speaker nuts. Remove speaker.

MODEL

TV1-9305A (Code 17T24)

CORONADO MODEL
TV1-9305A (Code 17T24)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of VHF tuner oscillator adjustments, it is necessary to remove the chassis from the cabinet. (See disassembly instructions

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Adjustment is located on the rear side of the chassis. Set the horizontal hold control at the center range and adjust the horizontal frequency coil (L27) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the buzz (R7) located on the rear side of the chassis for maximum sound and MINIMUM buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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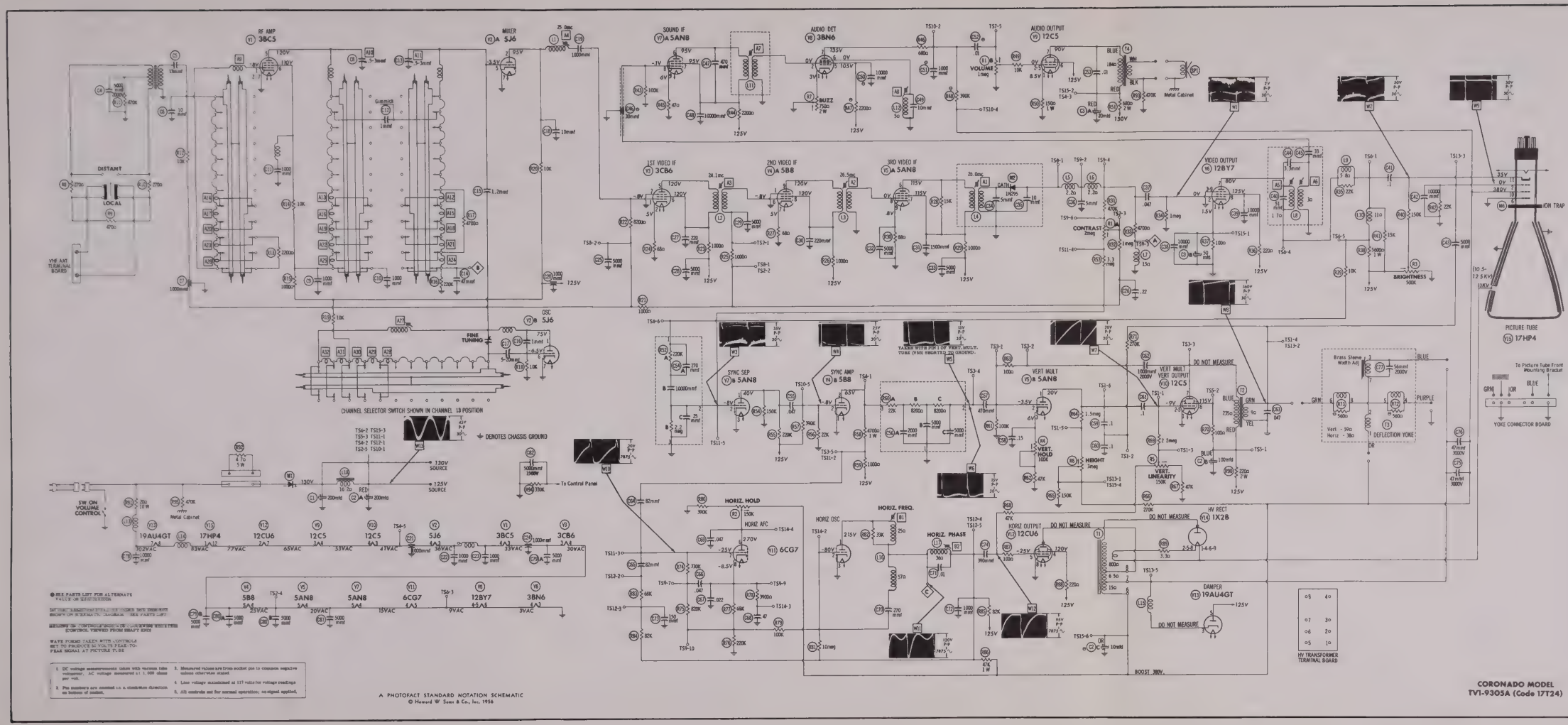
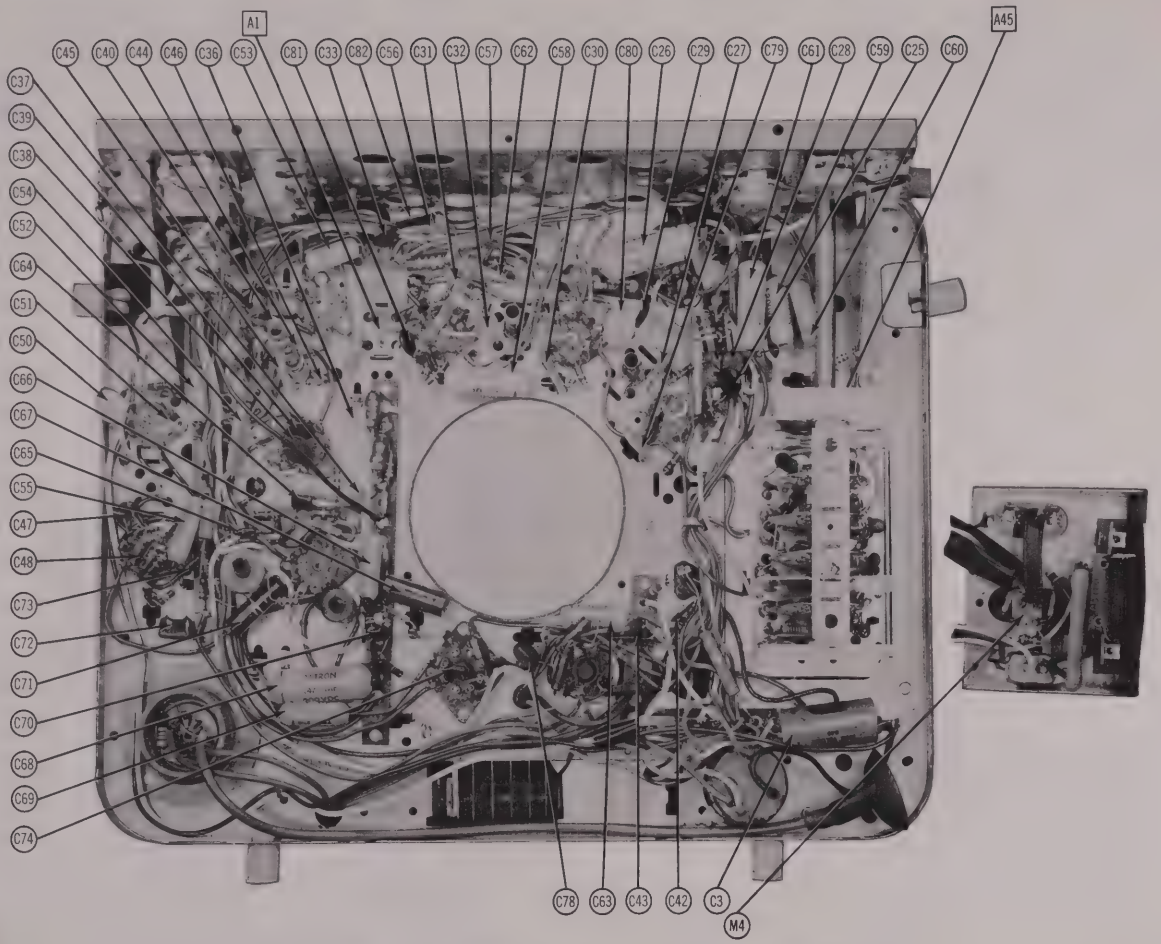
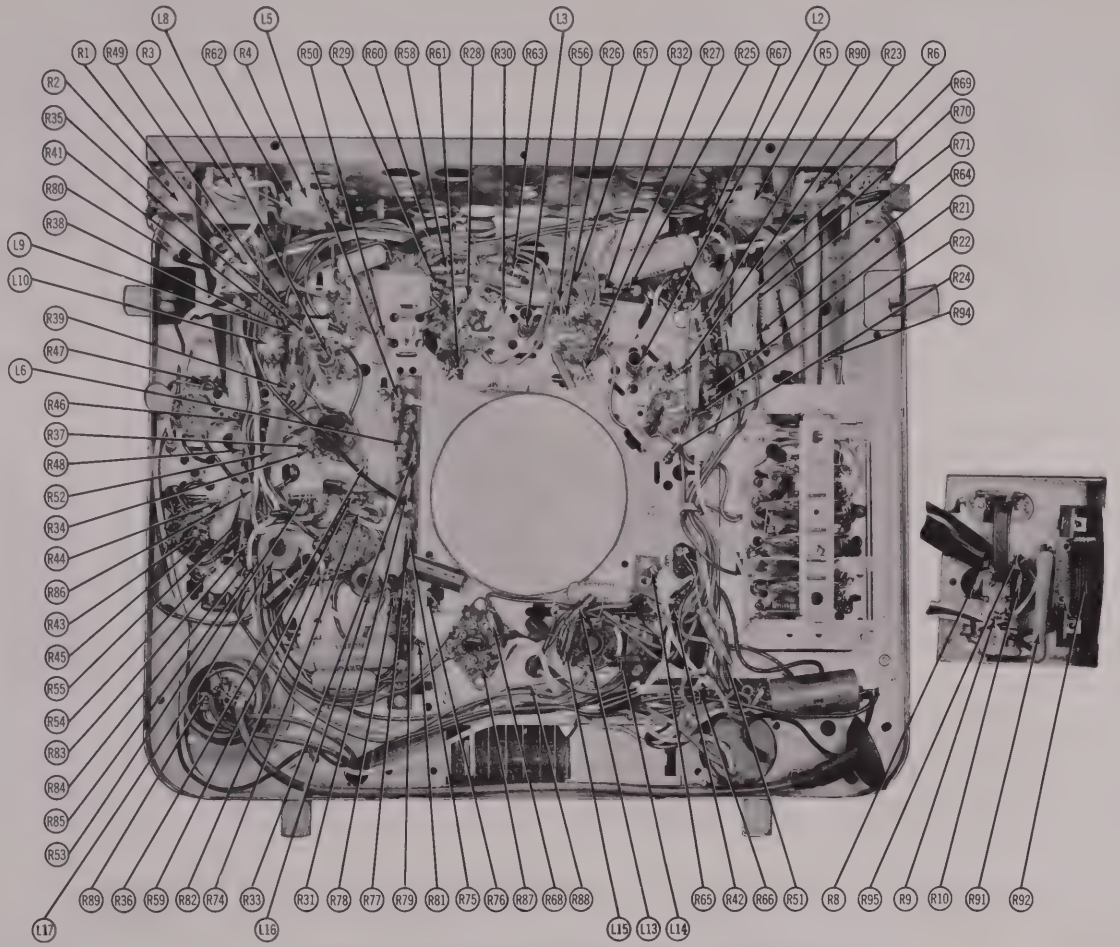


CORONADO MODEL TV1-9305A
(Code 17T24)

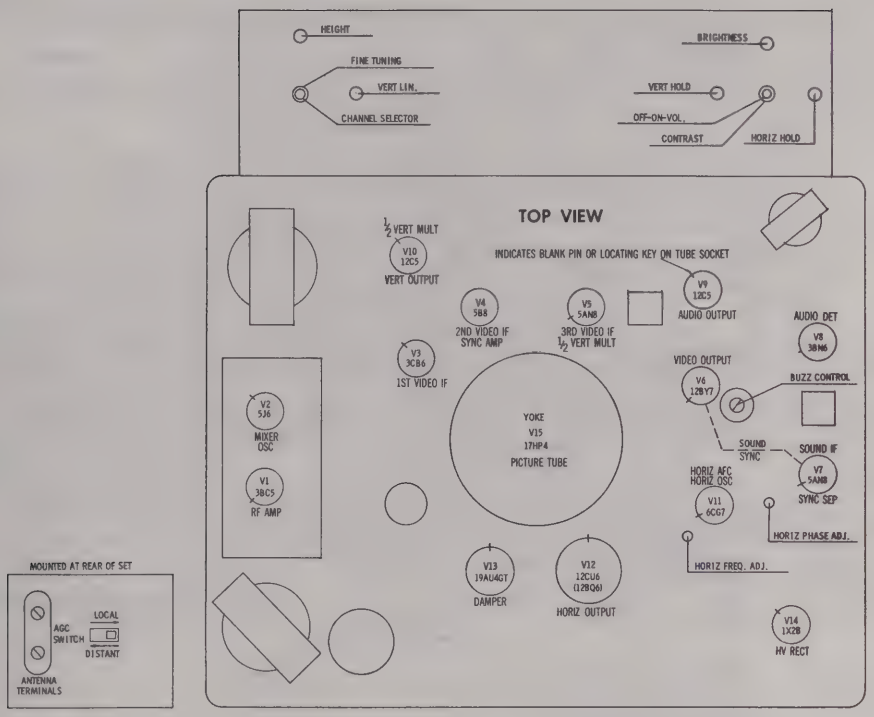


CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

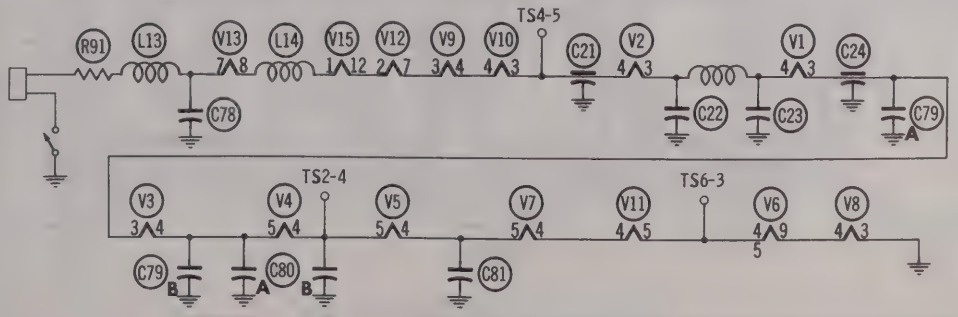
POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifier (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V15
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V4, V5, V10
No horiz. sync - V4, V11
No vert. or horiz. sync - V4, V7

SWEEP FAILURE
No raster, has sound - V11, V12, V13, V14, V15
No vertical deflection - V5, V10
Poor vert. linearity or foldover - V5, V10
Poor horiz. linearity or foldover - V11, V12, V13
Narrow picture - V11, V12, V13, V14, M1
Vert. off freq. - V4, V5, V10
Horiz. off freq. - V4, V11

NOTE: Since this receiver employs tubes used in series filament network, an open filament in any tube in series will cause the set to be inoperative. (See circuit below).



SET 335 FOLDER 5

DENVER, COLORADO

CORONADO MODEL
TV1-9305A (Code 17T24)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V11) to disable the high voltage.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Connect a 1000MMF capacitor across the scope terminals. Use only enough generator output to maintain approximately 2 volts on the VTVM.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating above converter tube. Low side to chassis.	Not used	26.0MC (Unmod)	4	USE VTVM. DC probe to point (A). Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	"	26.5MC	"	"	A2	"
3.	"	"	"	24.1MC	"	"	A3	"
4.	"	"	"	25.0MC	"	"	A4	"
5.	"	"	25MC (10MC Swp)	23.8MC 26.65MC	"	Vert. Amp. thru 10K to point (A). Low side to chassis.		Check for response curve similar to Fig.1. If necessary, retouch A1 thru A4 to obtain desired response.

4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust the fine tuning until sound bars just appear. Turn A5 full counter clockwise, then clockwise until the horizontal scanning lines are smooth and continuous. Readjust the fine tuning for best picture and clearest sound.

SOUND IF ALIGNMENT

Tune in a TV station and reduce the signal strength at the antenna terminals by using an attenuator or similar device until the signal is below the limiting level of the 3BN6 (V8) as indicated by a hiss in the sound. Adjust A6, A7, A8 and R7 for maximum clear sound and minimum buzz. If the hiss disappears during these adjustment, reduce signal strength until hiss returns.

RF AND MIXER ALIGNMENT

Connect the negative lead of a 1.5 volt bias supply to the ungrounded side of C25. Connect the positive side to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point (B). Low side to chassis.	A9, A10, A11	Adjust for maximum response with markers as shown in Fig. 2.
7.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A12, A13, A14	"
8.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5		A15, A16, A17	"
9.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4		A18, A19, A20	"
10.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3		A21, A22, A23	"
11.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2		A24, A25, A26	"

OSCILLATOR ALIGNMENT

Leave bias connected as under "RF and Mixer Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
All coil adjustments except A45 are made by expanding or compressing coil turns.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A27	Adjust to place sound marker in trap notch as in Fig. 3. Video marker should be at 50%.
13	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A28	Adjust to place sound marker in trap notch as in Fig. 3. Video marker should be at 50%. Adjustments are made by expanding or compressing coil turns.
			79MC (10MC Swp)	77.25MC 81.75MC	5		A29	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A30	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A31	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A32	

FIG. 1

FIG. 2

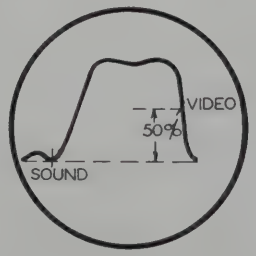
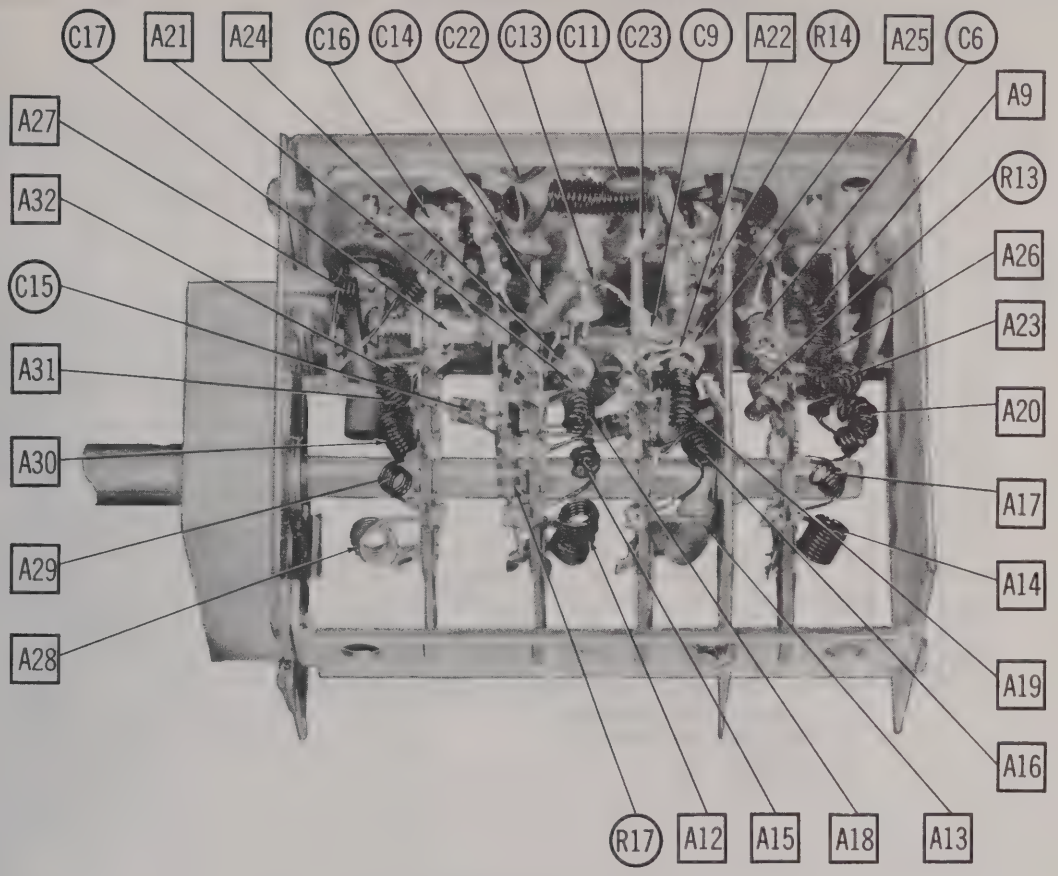
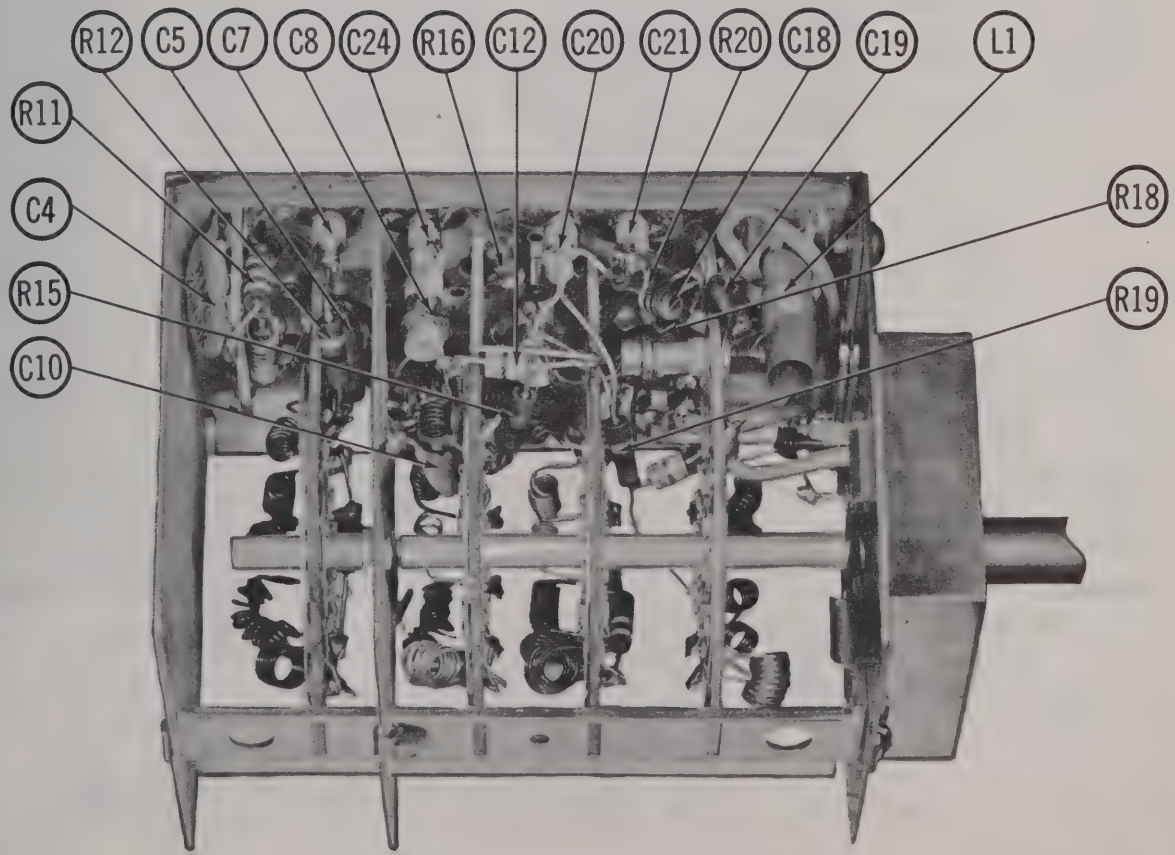


FIG. 3



RF TUNER-RIGHT SIDE

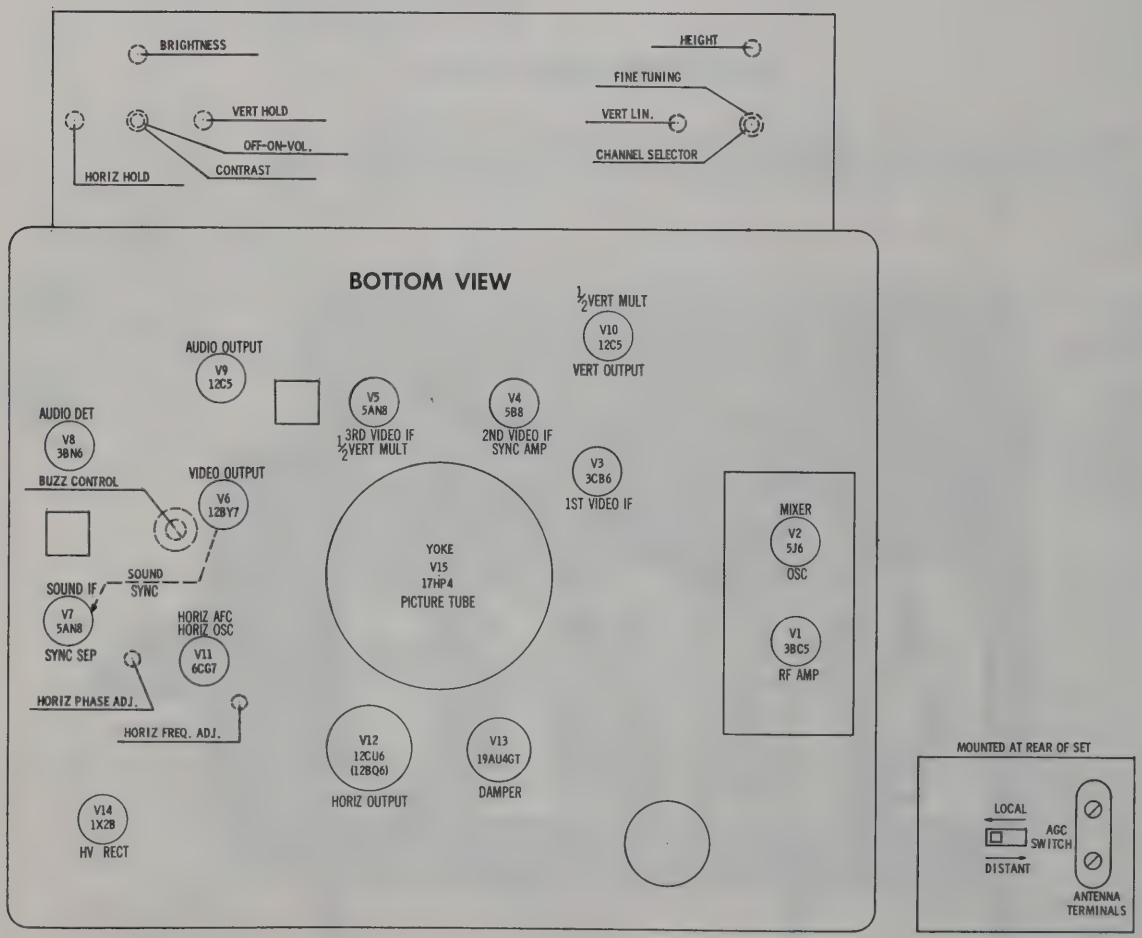


RF TUNER-LEFT SIDE

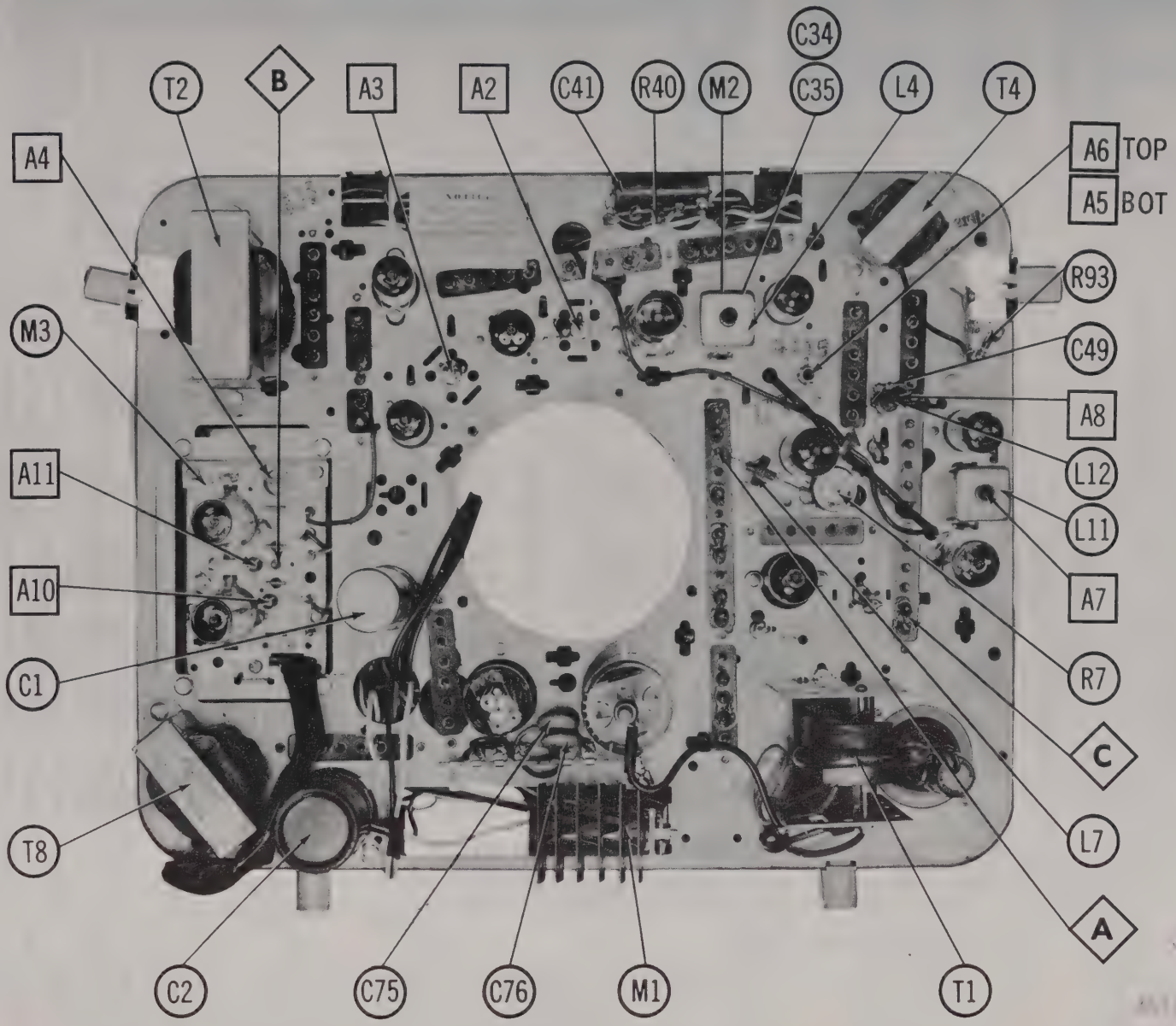
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BC5	● 1.5Meg	0Ω	8Ω	9Ω	† 1000Ω	† 11K	0Ω		
V2	5J6	† 10K	† 10K	9Ω	10Ω	220K	10K	0Ω		
V3	3CB6	● 1.5Meg	68 Ω	8Ω	7Ω	† 1000Ω	† 1000Ω	0Ω		
V4	5B8	0Ω	22K	† 5700Ω	6Ω	7Ω	● 1.5Meg	68Ω	† 1000Ω	† 1000Ω
V5	5AN8	● ▲ 2Meg	100K	● 60K	5Ω	6Ω	† 1000Ω	† 1000Ω	.3Ω	68Ω
V6	12BY7	100Ω	1Meg	0Ω	2Ω	2Ω	1Ω	† 4000Ω	† 235Ω	0Ω
V7	5AN8	† 90K	1.5Meg	0Ω	4Ω	5Ω	† 2200Ω	† 2200Ω	100K	47Ω
V8	3BN6	● 250Ω	.2Ω	0Ω	1Ω	† 2200Ω	5Ω	▲ 390K		
V9	12C5	150Ω	● 500K	15Ω	12Ω	● 500K	† 16Ω	† 750Ω		
V10	12C5	0Ω	● 2Meg	10Ω	12Ω	● 2Meg	† 330Ω	† 460Ω		
V11	6CG7	▲ 47K	320K	0Ω	4Ω	2Ω	●▲ 75K	1.5Meg	280K	NC
V12	12CU6	TP	17Ω	TP	† 235Ω	220K	TP	15Ω	0Ω	TOP CAP ▲ 7Ω
V13	19AU4GT	TP	NC	70K	NC	† 16Ω	TP	22Ω	19Ω	
V14	1X2B		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 800Ω
V15	17HP4	19Ω	22K	PIN 6 0Ω	PIN 10 ▲ 17Ω	PIN 11 ● † 220K	PIN 12 17Ω			

● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM OUTPUT OF MI.
▲ MEASURED FROM PIN 3 OF V13.
TP TIE POINT
NC NO CONNECTION.



TUBE PLACEMENT CHART



CHASSIS TOP VIEW

(Code 17124)

CORONADO MODEL TV1-9305A

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amp.	3BC5	
V2	Mixer-Osc.	6J6	
V3	1st Video IF Amp.	3CB6	
V4	2nd Video IF Amp. - Sync Amp.	6B6	
V5	3rd Video IF Amp. - Vert. Mult.	6AN8	
V6	Video Output	12BY7	

ITEM No.	USE	TYPE	NOTES
V7	Sound IF Amp. -Sync Sep.	6AN8	
V8	Audio Det.	3BN6	
V9	Audio Output	12C5	
V10	Vert. Mult.-Vert. Output	12C5	
V11	Horiz. AFC-Horiz. Osc.	6CB7	
V12	Horiz. Output	12CU6	Note 1
V13	Damper	12AU6GT	
V14	HV Rectifier	1X2B	

Note 1: 12BQ6 may be used in some version.

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	CORONADO PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V18	17EP4	17EP4-/ 17RP4 17EP4AB ①	17EP4, 17RP4 17EP4AB ①	17EP4, 17RP4 17EP4AB ①	① Aluminized ② Silver Screen "88"

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP.	VOLT	CORONADO PART No	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	300	150	8C-35720	AFHH1-71	XA004	FPU7 UTC49 WT447		D-085 WT-1560 D-090 WT-450	R3298*
C3A B	300 100	150 150	8C-35721	PR3-054	XB008 SHB1045				R3395*
C C3A B	10 30 10	350 150 150	Note 1 TH1038	TH1038	SHR3L15 SHR3L10	TCD497	TD-30-150 TD-30-25	FM-1330 FM-0250	R3297*

Note 1: When CBC is rated at 400volts, C3 part no. is 8C-35808.
* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	CORONADO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	8000	3000	RC5-90087							
C6	33		RC5-90080							
C7	10		RC5-90083	NPO-6S10	TCZ-10	TZ09	NPOA-100	ET-541	5TCC-Q5	
C8	10		RC5-90084							
C9	.5-3		RC5-91037		S3S-3		31S1-01-0S5	CT585A		
C10	1000		RC5-90059	BPD-001	DD-103	KD69	S01-001	DC531	5SK-D1	
C11	1000		RC5-90059	BPD-001	DD-103	KD69	S01-001	DC531	5SK-D1	
C13	1		RC5-90037	NPO-S11	TCZ-1	TZ03	NPOA-S10		5TCCB-V1	
C14	3-3		RC5-91037		S3S-3		31S1-01-0S3	CT585A		
C15	.47		RC5-90045	S147	DS-470	TZ99	GPSK-470	DC-5447	5GA-Q47	
C16	1.3		RC5-90034							
C17	1		RC5-90070							
C17	3-30		RC5-91058		TCZ-10	TZ09	NPOA-100	ET-541	5TCC-Q1	
C18	10		RC5-90083	NPO-6S10						
C19	1000		RC5-90059	BPD-001	DD-103	KD69	S01-001	DC531	5SK-D1	
C20	1000		RC5-91058							
C21	1000		RC5-91058							
C23	1000		RC5-90059	BPD-001	DD-103	KD69	S01-001	DC531	5SK-D1	
C24	1000		RC5-90059	BPD-001	DD-103	KD69	S01-001	DC531	5SK-D1	
C25	1000		RC5-91058							
C26	5000			BPD-005	DD-503	KD50	S11-005	DC535	5SK-D5	
C28	3-35	200		P35BN-33		CUB3P33		PT4033	3TM-P33	
C29	330			S1Z30	DS-331	TP39	GPSK-Z31	UC-5332	5GA-Y33	
C30	5000			BPD-005	DD-503	KD50	S11-005	DC535	5SK-D5	
C32	5000			BPD-005	DD-503	KD50	S11-005	DC535	5SK-D5	
C33	330			S1Z30	DS-331	TP39	GPSK-Z31	UC-5332	5GA-Y33	
C34	1500			BPD-0015	DD-153	KD71	S01-0015	DC5315	5SK-D15	
C35	5000			BPD-005	DD-503	KD50	S11-005	DC535	5SK-D5	
C36	5000			BPD-005	DD-503	KD50	S11-005	DC535	5SK-D5	
C37	5			NPO-5S	TCZ-5R7	Z01J	NPOA-050	ET-565	5TCCB-V47	
C38	10			NPO-6S10	TCZ-10	TZ09	NPOA-100	ET-541	5TCC-Q1	
C39	5			NPO-5S	TCZ-5R7	Z01J	NPOA-050	ET-565	5TCCB-V47	
C40	3-35	200		BPD-03	DF-303	CUB3S47		PT4047	3TM-S47	
C41	10000			BPD-01	DD-103	KD63	S11-01	DC531	5SK-E1	
C39	10000			BPD-01	DD-103	KD63	S11-01	DC531	5SK-E1	
C40	51			NPO-6S50	TCZ-51	TZ33	NPO-S3S-S50	ET-545	5TCC-Q5	
C41	.1	400		P44SN-1	DF-104	CUB4P1		PT401	4TM-P1	
C42	10000			BPD-01	DD-103	KD63	S11-01	DC531	5SK-E1	
C43	8000			BPD-008	DD-803	KD80	S11-008	DC538	5SK-D8	
C44	5.5			NPO-6S5.5	TCZ-5S3	TZ06	NPOA-3S3	ET-5533	5TCCB-V33	
C45	33			NPO-6S33	TZ15	NPO1-330	ET-5533	5TCC-Q33		Note 3
C46	30		14D-23772							
C47	470			16S4-00047	DS-471	S3S747	31S-471		M3-747	
C48	10000			BPD-01	DD-103	KD63	S11-01	DC531	5SK-E1	
C49	51			NPO-6S50	TCZ-10	TZ09	NPOA-100	ET-541	5TCC-Q	
C50	10000			BPD-01	DD-103	KD63	S11-01	DC531	5SK-E1	Note 2
C51	1000			BPD-001	DD-102	KD69	S01-001	DC531	5SK-D1	Note 2
C52	.01	400		BPD-01	DD-103	CUB4S1	GP3-333-103	PT401	4TM-S1	Note 3
C53	.01	400		BPD-01	DD-103	CUB4S1	GP3-333-103	PT401	4TM-S1	
C54A	3-70					TP41	S1-371	DC-5337	S1-371	
B	10000		11TA-34213	7PC-33S	7PC-10S	TP57	S11-01	DC-S11	7S7-3	
C	33					TP58	S3L-330	UC-5426		
C55	.047	200		BPD-05	DF-S03	CUB3S47		PT4047	3TM-S47	
C56A	3600							DC533		
B	5000		41A-23276	4PA-10S	4PC-10S	41ST1M1	41401-01	DC535	4V-1	
C	5000							DC535		
C57	470			D1-00047	DD-471	Q690	S11-471	DC-5347	5GA-T47	
C58	.15	200		P36SN-15		CUB3P15		PT4015	3TM-P15	
C59	.1	200		P36SN-1	DF-104	CUB3P1		PT401	3TM-P1	
C60	.1	200		P36SN-1	DF-104	CUB3P1		PT401	3TM-P1	
C61	.1	400		P44SN-1	DF-104	CUB4P1		PT401	4TM-P1	
C62	1000	2000	8G-34691	HVD-M-1000	DD30-102	VZD1	31KV-103		DC3D31	20GA-D1
C63	.047	400		BPD-05	DF-S03	CUB4S47			PT4147	4TM-S47
C64	.033	300		1469-00032	DS-S2C	S2R3G33	S31-S20		M3-465	3TM-S33
C65	33			1469-00032	DS-S20	22R3G33	S31-S20		M3-S2	
C66	.047	200		BPD-05	DF-S03	CUB3S47			PT4147	3TM-S47
C67	.033	300		1469-00032	DS-S2C	S2R3G33	S17-G2		PT4133	3TM-S33
C68	.47	200		P36SN-47		CUB3P47			PT4047	3TM-P47
C69	.047	400		BPD-05	DF-S03	CUB4S47			PT4047	4TM-S47
C70	270			1469-00027	DS-271	S3R727	S31-S71		M3-S27	
C71	.01	400								

CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	CORONADO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C72	1000			464-001		1RSD1	S11-102	MC8256	36S-21	
C73	100			NPO-6S100	D6-1S1	32SR2T15	S11-1S1	MC8246	36S-S16	
C74	390			S139C	D6-3S1	5SS729	GP2K-3S1	UC-5329	5GA-T39	
C75	47	3000	SG-34036	HVD-30-470	DD30-470	V3Q47	3KV-470	DC30447	30GA-Q47	
C76	47	3000	SG-34036	HVD-30-470	DD30-470	V3Q47	3KV-470	DC30447	30GA-Q47	
C77	56	3000			DD30-560		3KV-560	DC30456	30GA-Q56	
C78	10000			BPD-01	DD-103	KD63	S11-01	DC531	5SK-E1	
C79A	5000			BPD-S2005	DD3-503	DK079	61L-005	DC525	5HK-D5	
B	5000						61L-005	DC535	5HK-D5	
C80A	5000			BPD-S2005	DD3-503	DK079	61L-005	DC525	5HK-D5	
B	5000						61L-005	DC535	5HK-D5	
C81	5000			BPD-005	DD-503	KD50	61L-005	DC535	5HK-D5	
C82	5000	1500		HVD-15-4700	DD15-502	V3D5	15S5Y-472	PT1535	30HK-D5	

† Items C54A, C54B, C54C, R35A and R35B are combined in one unit.
* Items C56A, C56B, C56C, R60A, R60B and R60C are combined in one unit.
Note 1. In some versions items C80, C81, C83, R47 and R48 are combined in one unit. (part #17A-23143)
Note 2. C48 is the capacity of the sound take-off lead.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA				INSTALLATION NOTES
	RESISTANCE	WATTS	CORONADO PART No	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	3Meg		S10B-35291		R17V-590		UR17758	Contrast (Panel)
B	1Meg							Volume & Switch (Rear)
R2A	150K		S10B-35693-1	AB-43	A47-150K-S	QJ1-328	TA184L	Horiz Hold
B	Shaft		Not Req.	AK-4	K38-3	Not Req.	Not Req.	Attach to R2A
R3A	500K		S10B-23695	AB-58	A47-500K-S	QJ1-133	TA551L	Brightness
B	Shaft		Not Req.	AK-4	K38-3	Not Req.	Not Req.	Attach to R3A
R4A	100K		S10B-23925	AB-40	A47-100K-S	QJ1-128	PTA1EL	Vert. Hold
B	Shaft		Not Req.	AK-4	K38-3	Not Req.	Not Req.	Attach to R4A
R5A	150K		S10B-23693-1	AB-43	A47-150K-S	QJ1-328	TA184L	Vert. Linearity
B	Shaft		Not Req.	AK-4	K38-3	Not Req.	Not Req.	Attach to R5A
R6A	3Meg		S10B-23696	AB-84	A47-3Meg-S	QJ1-140	TA351	Height
B	Shaft		Not Req.	AK-1	F38-1	NQ	Not Req.	Attach to R6A
R7	750Ω	2	A3SD-23507		39-750			Beam

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CORONADO PART No.	IRC PART No.	
R2	270Ω			BTS-270	
R3	470Ω			BTS-470	
R10	270Ω			BTS-270	
R11	470K			BTS-470K	
R12	10K			BTS-10K	
R13	330Ω			BTS-3300	
R14	10K			BTS-10K	
R15	1000Ω			BTS-1000	
R16	330K			BTS-330K	
R17	4700Ω			BTS-4700	
R18	10K			BTS-10K	
R19	10K			BTS-10K	
R20	10K			BTS-10K	
R21	1000Ω			BTS-1000	
R22	8300Ω				
R23	1000Ω			BTS-1000	
R24	56Ω			BTS-56	
R25	1000Ω			BTS-1000	
R26	1000Ω			BTS-1000	
R27	56Ω			BTS-56	
R29	15K 5%			BTS-15K	
R30	1000Ω			BTS-1000	
R33	68Ω			BTS-68	
R31	470K			BTS-470K	
R32	15Meg			BTS-15Meg	
R33	4700Ω			BTS-4700	
R34	1Meg			BTS-1Meg	
R35	33K			BTS-33K	
R36	220Ω			BTS-220	
R37	100Ω			BTS-100	
R38	5600Ω	1		BTA-5600	
R39	10K			BTS-10K	
R40	150K			BTS-150K	
R41	15K 5%			BTS-15K 5%	
R43	33K			BTS-33K	
R43	100K			BTS-100K	
R44	3300Ω			BTS-3300	
R45	47Ω			BTS-47	
R46	680Ω			BTS-680	
R47	2200Ω			BTS-2200	Note 1
R48	390K			BTS-390K	Note 1
R49	10K			BTS-10K	
R50	150Ω	1		BTA-150	
R51	680Ω	2		BTS-680	
R52A	220K		17TA-34213	BTS-220K	
B	2.2Meg			BTS-2.2Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CORONADO PART No.	IRC PART No.	
R53	3.3Meg			BTS-3.3Meg	
R54	150K			BTS-150K	
R55	330K			BTS-330 K	
R56	22K			BTS-22K	
R57	390K			BTS-390K	
R58	4700Ω	1		BTA-4700	
R59	1000Ω			BTS-1000	
R59A	33K			BTS-33K	
B	62000		41TA-23276	BTS-6200	
C	18500			BTS-9300	
R61	100K			BTS-100K	
R62	47K			BTS-47K	
R63	100K			BTS-100K	
R64	1.5Meg			BTS-1.5Meg	
R65	150K			BTS-150K	
R66	270K			BTS-270K	
R67	47K			BTS-47K	
R68	47K			BTS-47K	
R69	2.7Meg			BTS-2.7Meg	
R70	100Ω			BTS-100	
R71	270K			BTS-270K	
R72	560Ω				Note 2
R73	560Ω				Note 2
R74	330K			BTS-330K	
R75	680K			BTS-680K	
R76	330K			BTS-330K	
R77	68K			BTS-68K	
R78	3900Ω				
R79	100K			BTS-100K	
R80	390K				
R81	100Ω			BTS-100	
R82	33K				
R83	68K			BTS-68K	
R84	82K			BTS-82K	
R85	82K			BTS-82K	
R86	47K	1		BTA-47K	
R87	100Ω			BTS-100	
R88	330Ω			BTS-330	
R89	1.5Ω		8C1-1009	BTS-1.5	
R90	330Ω	3	8C-28063	BTS-330	
R91	20Ω	10	46M-25577	PWH-20	
R92	4.7Ω	5			
R93	470Ω			BTS-470K	
R94	330K			BTS-330K	
R95	470K			BTS-470K	

† Items R35A, R35B, C54A, C54B, C54C are combined in one unit.
* Items R60A, R60B, R60C; C56A, C56B, C56C are combined in one unit.
Note 1. In some versions, items R47, R48, C50, C51, C53 are combined in one unit. (Part #17A-23143).
Note 2. Some versions use a 680Ω resistor in this application.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA								
		CORONADO PART No.	Halldorson PART No.	Mant PART No.	RCA TYPE No.	Rem PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T1	Horiz. Output Trans.	12E-23007								
T2	Vert. Output Trans.	12E-23101-1	21900 ①							
T3A	Yoke-Horiz. (51MΩ)	20L-23019	DF606 ②	MDF-75 ②		T70F25 ③④	DY-15A ③	Y-18 ③	Y-18-1 ③ ④	
B	Vert. (43MΩ)	16M-24493 ③								

① Use 5 to 1 turns ratio.
② Yoke rear cover and centering device.
③ Requires new centering device.
④ Connect horizontal yoke damping network across terminals #3 and #7. Use original if necessary.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	CORONADO PART No.	Halldorson PART No	Stancor PART No	Thordorson PART No	Triad PART No.	
T4	2.1KΩ	3-4Ω	12C-23548-1	21001	A-3938	A-3870	S-1X	

SPEAKER

ITEM No	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CORONADO PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	18A-23524	4A07	33S81	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CORONADO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	1st. Video IF	.6Ω		13A-23162	17-1064	TV-118	6349	
L2	2nd. Video IF	.8Ω	.3Ω	13A-23163	17-1064	TV-118	6350	
L3	3rd. Video IF	.8Ω	.3Ω	13A-23129	17-1064	TV-118	6350	Part number includes
L4	4th. Video IF	.8Ω	.3Ω	13B-26011				MA, CM, CS5
L5	Series Peaking Coil	3.5Ω		301-15606	18-0033		4636	30 Microhenries
L6	Series Peaking Coil	3.3Ω		301-15606	18-0033		4636	30 Microhenries
L7	Shunt Peaking Coil	15Ω		18A-24275			6349	770 Microhenries
L8A	4.5MC Trap	1.7Ω						
B	1st. Sound IF	3Ω		301-23730-1				
L9	Series Peaking Coil	5.8Ω		18A-24020	19-3180	TV-184	6180	170 Microhenries
L10	Shunt Peaking Coil	11Ω		18A-24019	19-3500		6138	480 Microhenries
L11	2nd. Sound IF	.3Ω	.3Ω	301-23073				
L12	Quadrature Coil	9Ω		301-23727	20-1005		1480	
L23	Fil. Choke	.5Ω		18A-26520	18-1004		4610	8 Microhenries
L24	Fil. Choke	.5Ω		18A-26520	18-1004		4610	8 Microhenries
L25	RF Choke	.5Ω		18A-26520	18-1004		4610	8 Microhenries

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CORONADO PART No.	MEISSNER PART No.	MERIT PART No.	RCA TYPE No.	Rem PART No.	Thordorson PART No.	
L26	62Ω		301-24473-1		6313				Tapped @87Ω-Horiz. Osc. Horiz. Phase
L27	36Ω		301-24473-2		6314				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (MINIMUM 1000 ~)	CORONADO PART No.	Halldorson PART No	Merit PART No.	Stancor PART No	Thordorson PART No	Triad PART No.	
L28	250A	18.3Ω	.7H	16B-23438			26C44	C-32X		

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	CORONADO PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.250A	31J25315	1541A	M2350	6S350	6QA2	250A	

CRYSTAL DIODES

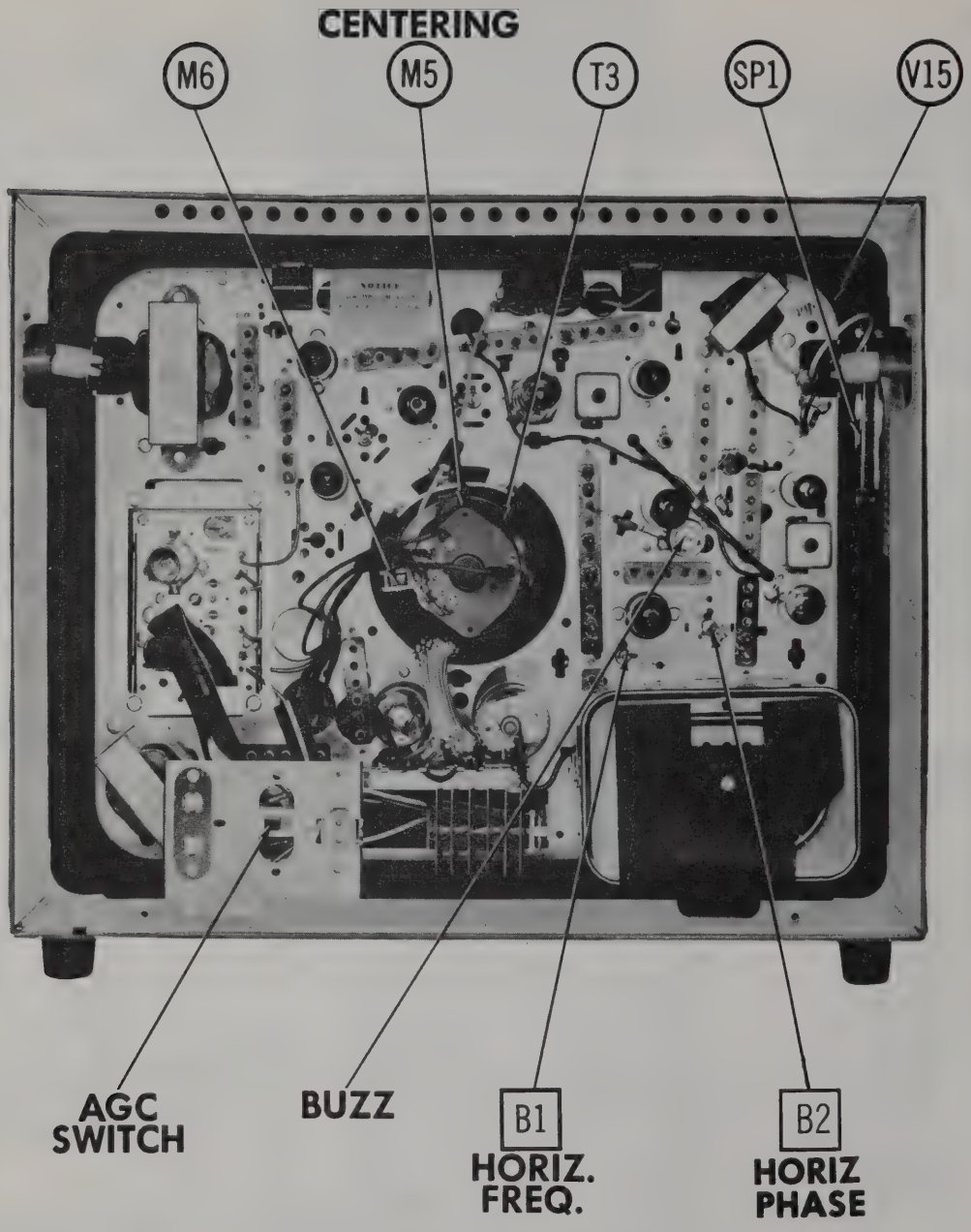
ITEM No.	OSC. TYPE	REPLACEMENT DATA		NOTES
		CORONADO PART No.	SYLVANIA PART No.	
MC1	1N295*		1N60	Video Detector (Digital)

* Some versions may use crystal diode type CK706A in this application.

MISCELLANEOUS

ITEM No.	PART NAME	CORONADO PART No.	NOTES
M3	Tuner	21L-26029	VHF
M4	Switch		Area Selector (DPDT - Slide Type)
M5	Centering Device	16M-24493	Includes deflection yoke (T3) Rear Cover
M6	Ion Trap	16M-19705	
	Cabinet	20B-23571-2	
	Knob	5B-23606-A23	Channel Selector
	Knob	5B-23607-A23	Fine tuning
	Knob	5B-23608-A23	Contrast
	Knob	5B-23609-A23	On-off-volume
	Knob	5B-23539-A23	Control (3 used)
	Safety Glass	30M-25276	

CORONADO MODEL TV1-9305A (Code 17703)



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Adjust the controls for a normal picture. Set the horizontal hold control at the center of its range.

Short the horizontal phase coil (L28) by connecting a clip lead across it. Adjust the horizontal frequency coil slug (B1) until the picture synchronizes horizontally. Set the slug in the center of the range in which the picture remains in sync.

Remove the clip lead from across L28 and connect the vertical amplifier of an oscilloscope thru a 10MMF capacitor to point Ⓒ. Low side to chassis. Adjust the horizontal phase slug (B2) for waveform shown in Fig. 4. The round peak and the sharp peak must be of equal amplitude. Keep the picture in sync during this adjustment with the horizontal hold control and B1.

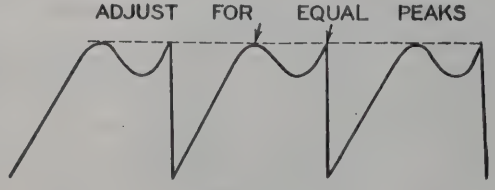
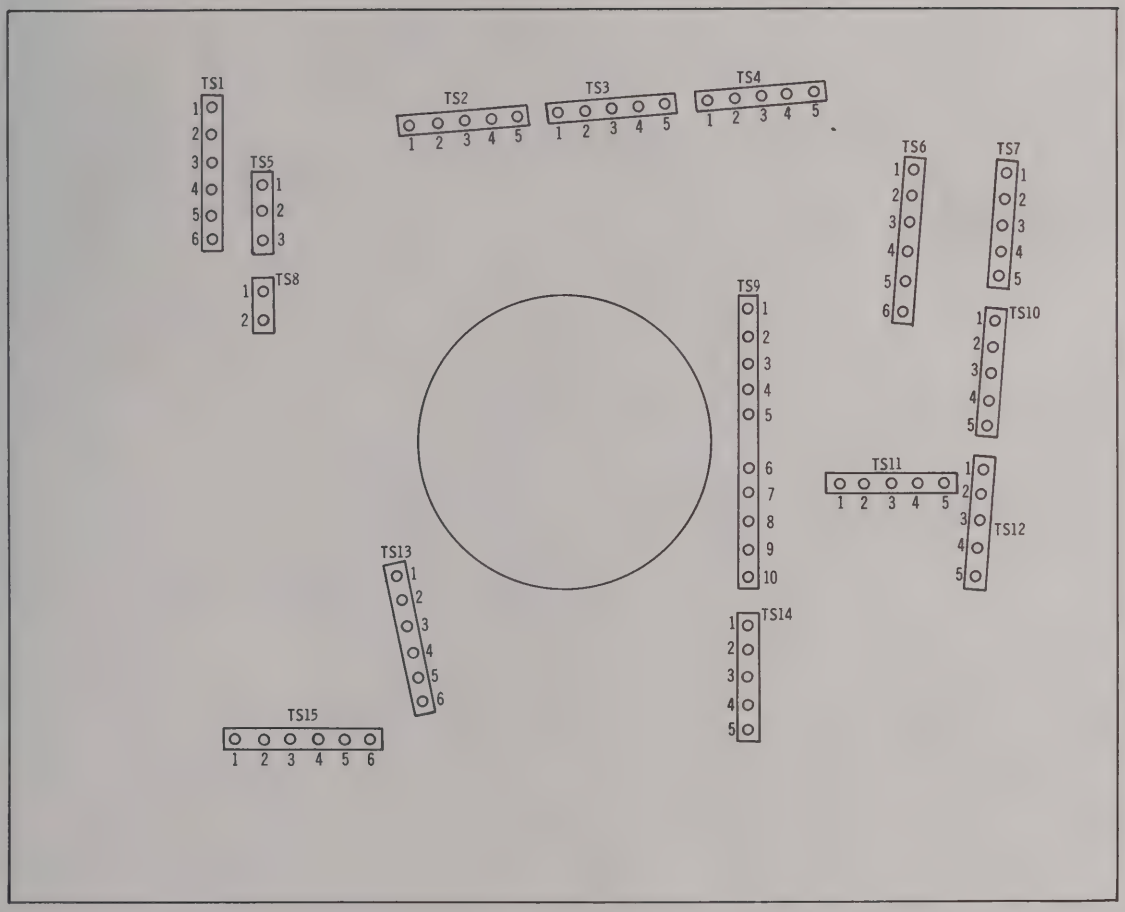


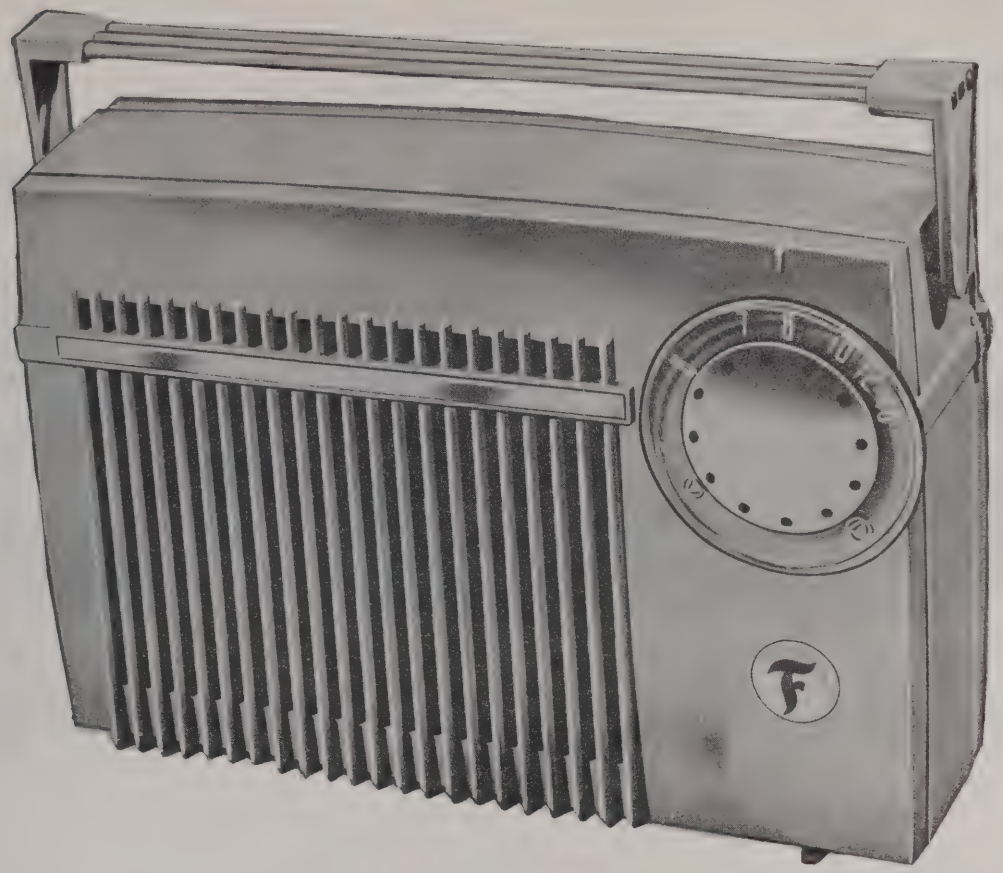
FIG. 4



TERMINAL LOCATION CHART

FIRESTONE MODEL 4-C-27 (Code 1-5-5P5)

FIRESTONE MODEL 4-C-27 (Code 1-5-5P5)



FIRESTONE MODEL 4-C-27 (Code 1-5-5P5)

TRADE NAME	Firestone Model 4-C-27 (Code 1-5-5P5)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Converter, 1U4 IF Amplifier, 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY RATING	110-120 Volts AC-DC (or) 7.5 Volts "A" Supply & 67.5 Volts "B" supply .12 Amp. @ 117 Volts AC (or) 55MA @ 7.5 Volts DC & 9.5MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"
4.		"	600KC	Tune to 600KC signal	"	A7	Adjust for maximum output while rocking tuning gang.

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PARTS LIST AND DESCRIPTIONS

FIRESTONE MODEL 4-C-27

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	Converter	1R5	1R5	
V2	IF Amplifier	1U4	1U4	
V3	Det.-AVC-AF Amplifier	1U5	1U5	
V4	Output	3V4	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	150	CE-1034				CDB-1012	T-300	
B	60	150							
C	100	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	1.5			NP0A-S11.5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C3	.05	200	CP-503-2M	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C4	3		CT-3	NP0-S13.3	TCZ-3R3	TZ06	NP0A-030	ZT-553	5TCCB-V33	
C5	10000		CC-103-5	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	220		CC-221-5	BPD-00022	D6-221	G051	811-221	UC-5322	5GA-T22	
C7A	150									
B	2000									
C	150		♦ PC-165		♦PC-165					
D	10000									
E	5000									
C8	2000		CC-202-5	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C9	.1	200	CP-104-2M	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C10	10000		CC-103-5	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C11	.047	400	CP-473-4	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C12	1000		†HPC-1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	

♦ Items C7A, C7B, C7C, C7D, C7E, R8A, R8B, R8C and R8D are combined in one unit.
† Items C12 and R4 are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FIRESTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1Meg	½						Volume (Note 1)

Note 1. Some versions may use 2Meg in this application.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	100KΩ		RC-104-1	BTS-100K	
R3	15KΩ		RC-153-1	BTS-15K	
R4	10Meg		†HPC-1	BTS-10Meg	
R5	47KΩ		RC-473-1	BTR-47K	
R6	3.3Meg		RC-335-1	BTR-3.3Meg	
R7	150Ω		RC-151-1	BTS-150	

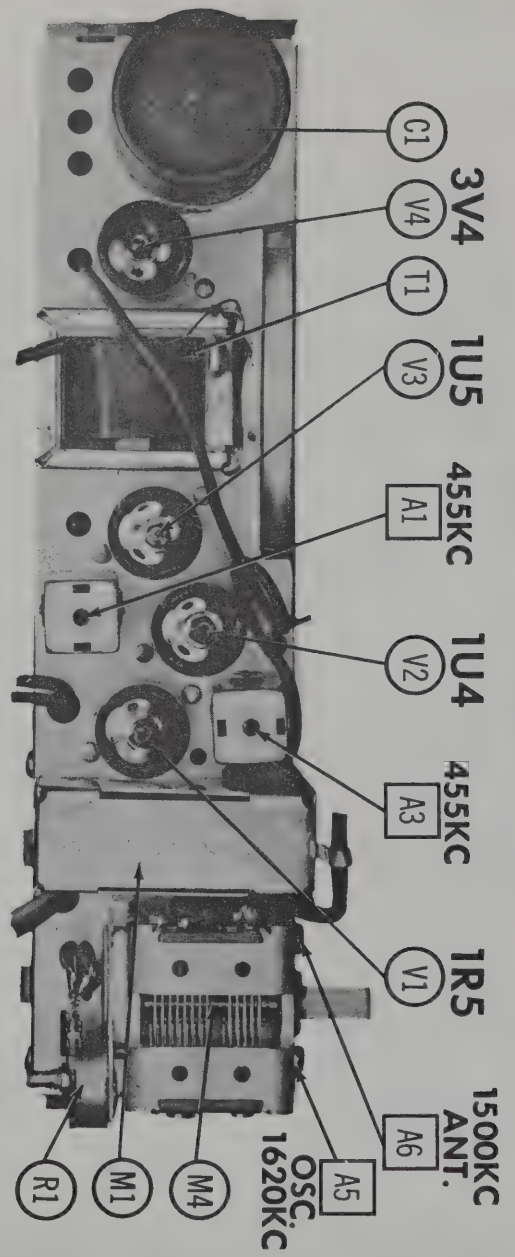
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R8A	10Meg			BTS-10Meg	
B	4.7Meg		♦ PC-165	BTS-4.7Meg	
C	1Meg			BTS-1Meg	
D	3.3Meg			BTS-3.3Meg	
R9	680Ω		RC-681-1	BTS-680	
R10A	750Ω	15	RW-2251T-31		
B	1500Ω	15			
R11	75Ω	2	RW-75-8		

♦ Items R8A, R8B, R8C, R8D, C7A, C7B, C7C, C7D, C7E are combined in one unit.
† Items R4 and C12 are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	10KΩ	3-4Ω	TR-108		A2927			S-11Z	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	FIRESTONE PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3 - 4Ω	SP106	4A07	223S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1.7Ω		LPFE-21				
L2	Osc. Coil	.8Ω	5Ω	LC-52	14-1073		69-OSC *	
L3	Input IF	16Ω	16Ω	LF-62	16-6800		12-C1	
L4	Output IF	16Ω	16Ω	LF-62	16-6801		12-C2	

* Use leads as mounting support.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	FIRESTONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.056ADC		1003A	RS75	6S65		65	

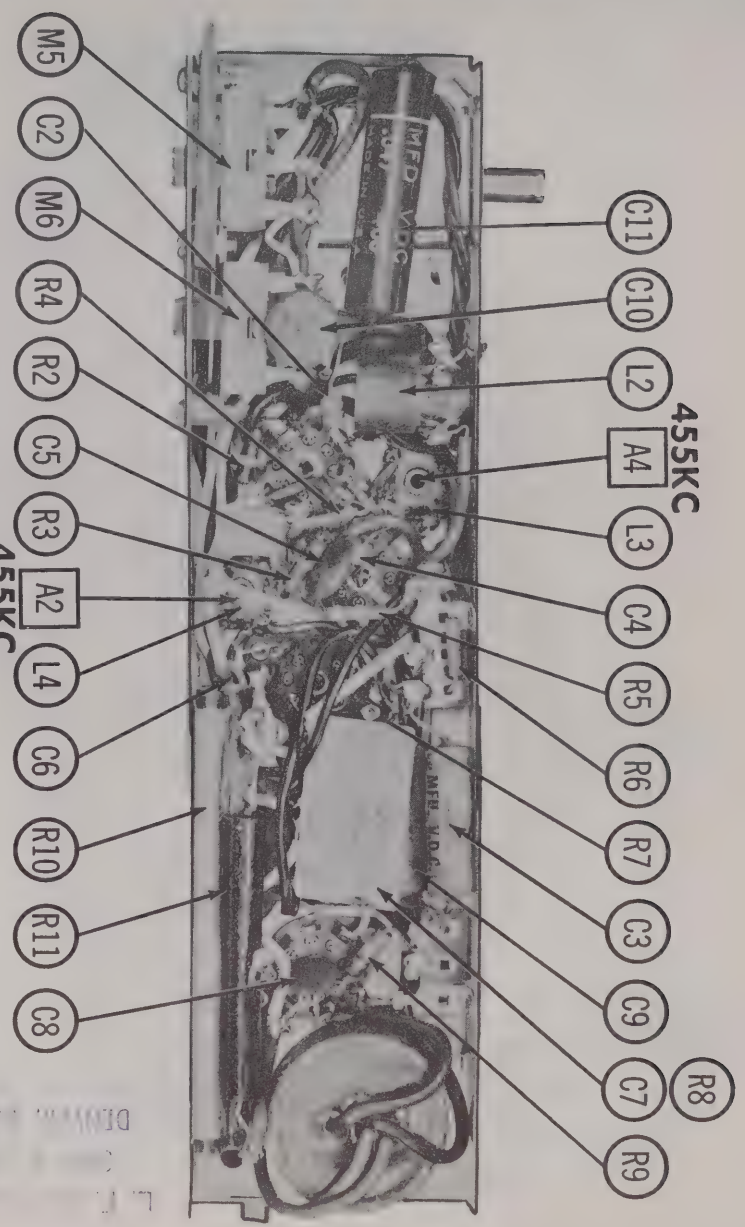
BATTERIES

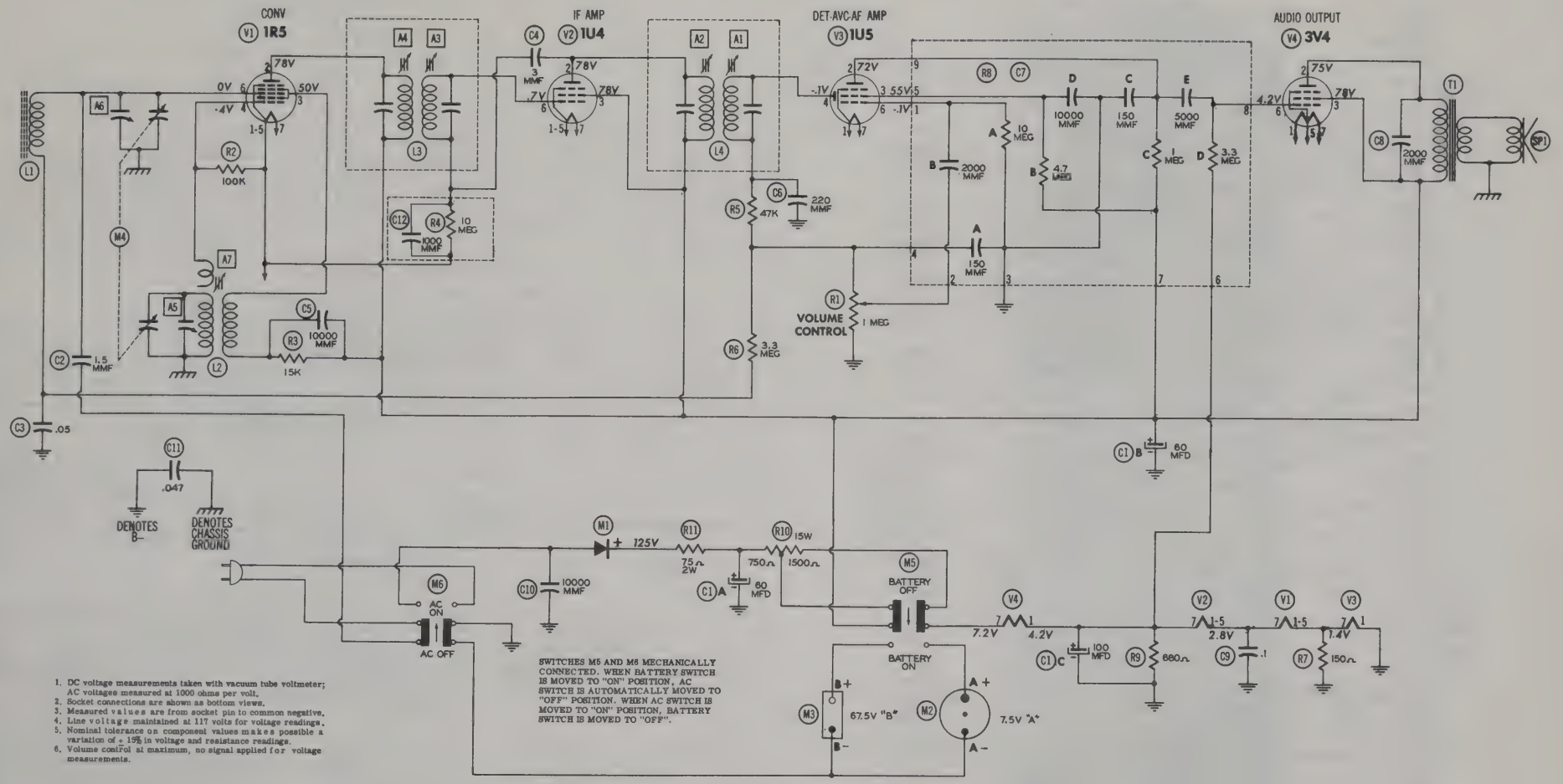
ITEM No.	VOLTAGE	FIRESTONE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	7.5V"A"	4-D-136	717			C5			
M3	67.5V"B"	4-D-135		477			P45		

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M4	Tuning Cap.	CV-69	2 Gang (8-215MMF, 12-110MMF)
M5	Switch		Battery (DPDT-Slide type)
M6	Switch		AC (DPDT-Slide Type)

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	•	†825Ω	†15.8KΩ	100KΩ	•	4.3Meg	•
V 2	1U4	•	†825Ω	†825Ω	TP	•	10Meg	•
V 3	1U5	•	†1Meg	†4.7Meg	1Meg	NC	10Meg	•
V 4	3V4	•	†1.2KΩ	†825Ω	NC	•	3.3Meg	•

† MEASURED FROM OUTPUT OF M1.
NC - NO CONNECTION.
TP - TIE POINT
• DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE

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GROMMES
56PG

GROMMES
56PG

TRADE NAME	Grommes Model 56PG
MANUFACTURER	Precision Electronics, 9101 King Ave., Franklin Park, Ill.
TYPE SET	AC Operated 12 Watt Audio Amplifier
TUBES (SIX)	Types 12AX7 Preamplifier, 12AX7 AF Amplifier, 12AX7 AF Amp.-Phase Inv., (2) 6V6GT Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC - 60 Cycles RATING .61 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

GROMMES MODEL 56PG

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamplifier	12AX7	
V2	AF Amplifier	12AX7	
V3	AF Amp. -Phase Inv.	12AX7	

ITEM No.	USE	TYPE	NOTES
V4	Output	6V6GT	
V5	Output	6V6GT	
V6	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	GROMMES PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	400		AFH4-117-45		FP367.5	TMT-157	Q-250	R2246*
B	■30	350				TC62	TD-40-450	MTD-4510	
C	▲10	300							
D	20	25							
C2A	▲10	250			B020	FP231	TMD-23	D-105	R2245*
B	■10	250			BRH121	TC2501	TD-100-15	MTH-1210	
C	100	10							

* Non catalog item.

FIXED CAPACITORS

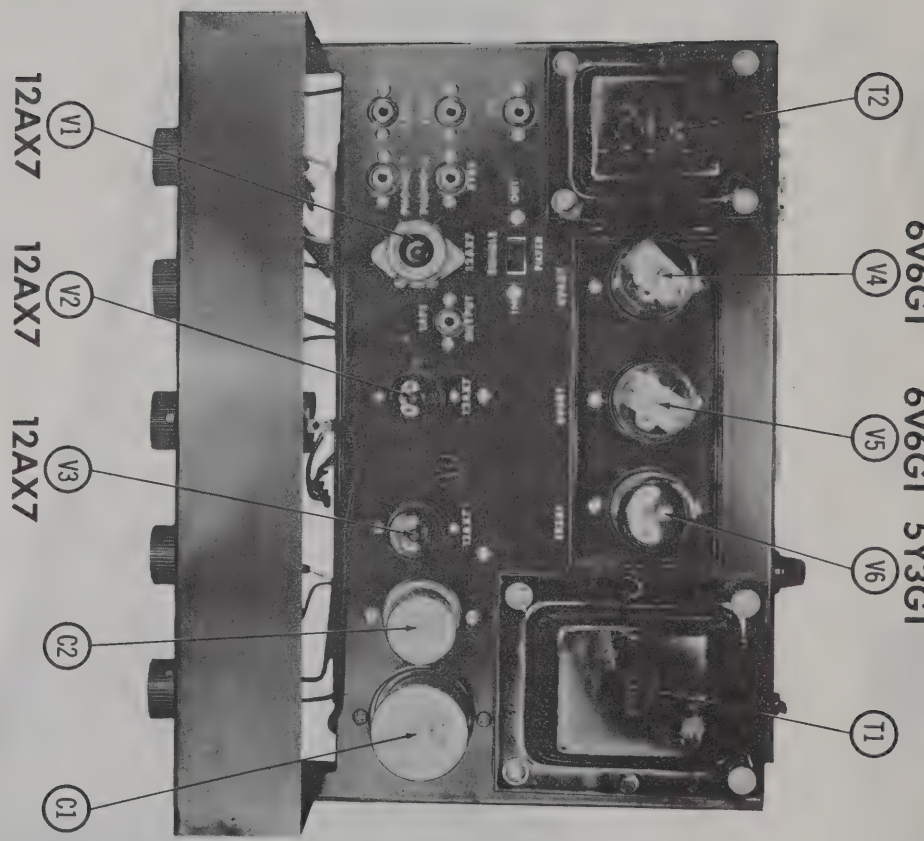
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	GROMMES PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	100	500		NP0-S1100	TCZ-100	22R5T1	801-101	MCB235	MS-31	
C4	1000			1464-001		1R5D1	811-102	MCB255	MS-21	
C5	1500			1464-0015		1R5D15	811-152	MCB456	MS-215	
C6	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C7	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C8	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C9	3300			1464-0033		1R5D33			MS-233	
C10	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C11	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C12	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C13	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C14	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C15	470			1464-00047	D6-471	5R5T47	811-471		MS-347	
C16	3000			1464-003		1R5D3		MCB461	MS-23	
C17	3000			1464-003		1R5D3		MCB461	MS-23	
C18	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C19	250	500		NP0-S1250	D6-251	22R5T25	811-251	MCB240	MS-325	
C20	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C21	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C22	1000			1464-001		1R5D1	811-102	MCB255	MS-21	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	GROMMES PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	W4567	AHT-15#				Loudness, Tapped@ 5K & 100K
B	Shaft		Not Req.	AK-9				Attach to R1A
R2A	500K	½		AB-60	A47-500K-Z	Q13-133	U48	Level
B	Shaft			AK-9	RS-2	Not Req.	Not Req.	Attach to R2A
C	Switch			KB-1	SWE-12	76-1	US-26	Attach to R2A
D	Cover			KB-5	Not Req.	Not Req.	Not Req.	Attach to R2C
R3A	1Meg	½	TC-1M	AB-69	A47-1Meg-S	Q11-137	U54	Bass
B	Shaft		Not Req.	AK-9	RS-2	Not Req.	Not Req.	Attach to R3A
R4A	1Meg	½	TC-1M	AB-69	A47-1Meg-S	Q11-137	U54	Treble
B	Shaft		Not Req.	AK-9	RS-2	Not Req.	Not Req.	Attach to R4A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GROMMES PART No.	IRC PART No.	
R5	47K			BTS-47K	
R6	100K	1		BTA-100K	
R7	1000Ω 5%			BTS-1000 5%	
R8	4. 7Meg			BTS-4. 7Meg	Note 1
R9	4. 7Meg			BTS-4. 7Meg	
R10	100K	1		BTA-100K	
R11	100K			BTS-100K	
R12	2. 2Meg			BTS-2. 2Meg	
R13	100K			BTS-100K	
R14	47K			BTS-47K	
R15	22K			BTS-22K	
R16	22K			BTS-22K	
R17	100K			BTS-100K	
R18	4. 7Meg			BTS-4. 7Meg	Note 1
R19	100K			BTS-100K	
R20	100K			BTS-100K	
R21	1000Ω 5%			BTS-1000 5%	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GROMMES PART No.	IRC PART No.	
R22	22K			BTS-22K	
R23	470K			BTS-470K	
R24	68K			BTS-68K	
R25	68K			BTS-68K	
R26	68K			BTS-68K	
R27	10K			BTS-10K	
R28	10K			BTS-10K	
R29	220K			BTS-220K	
R30	100Ω 5%			BTS-100 5%	
R31	220K			BTS-220K	
R32	220K			BTS-220K	
R33	47K			BTS-47K	
R34	270K			BTS-270K	
R35	300Ω	10		PW10-300	
R36	1000Ω			BTS-1000	
R37	2700Ω			BTS-2700	
R38	5600Ω	2		BTB-5600	

Note 1: Some versions use 3. 3Meg in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	GROMMES PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @. 61A	680VCT @. 079A	5VAC @ 2A	6. 3VCT @ 2A	TP-3L	P9311 ①		PM-8409①	24R05	R-14B

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	GROMMES PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	7. 5K	16Ω tap@ 8Ω, 4Ω	TO-12L				22S66 ①		① Drill new mounting holes.

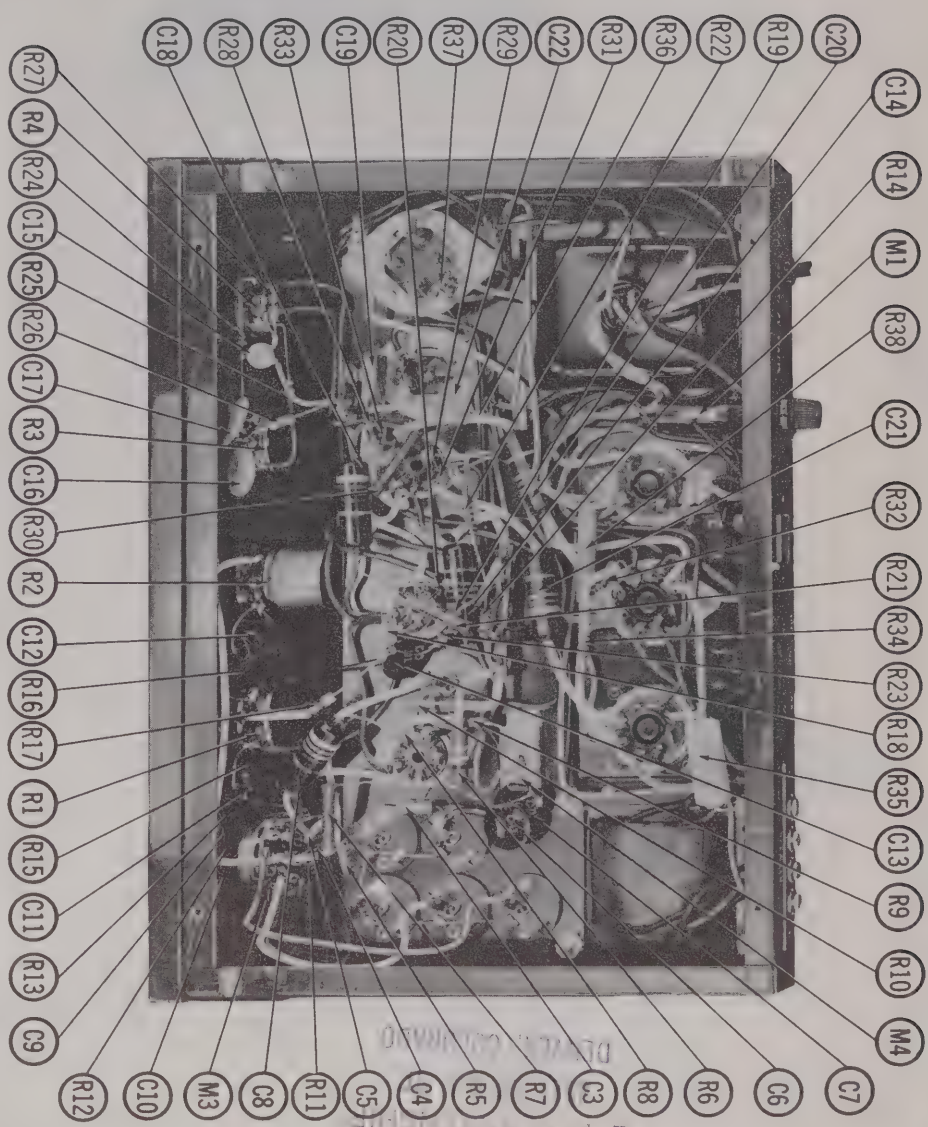
FUSES

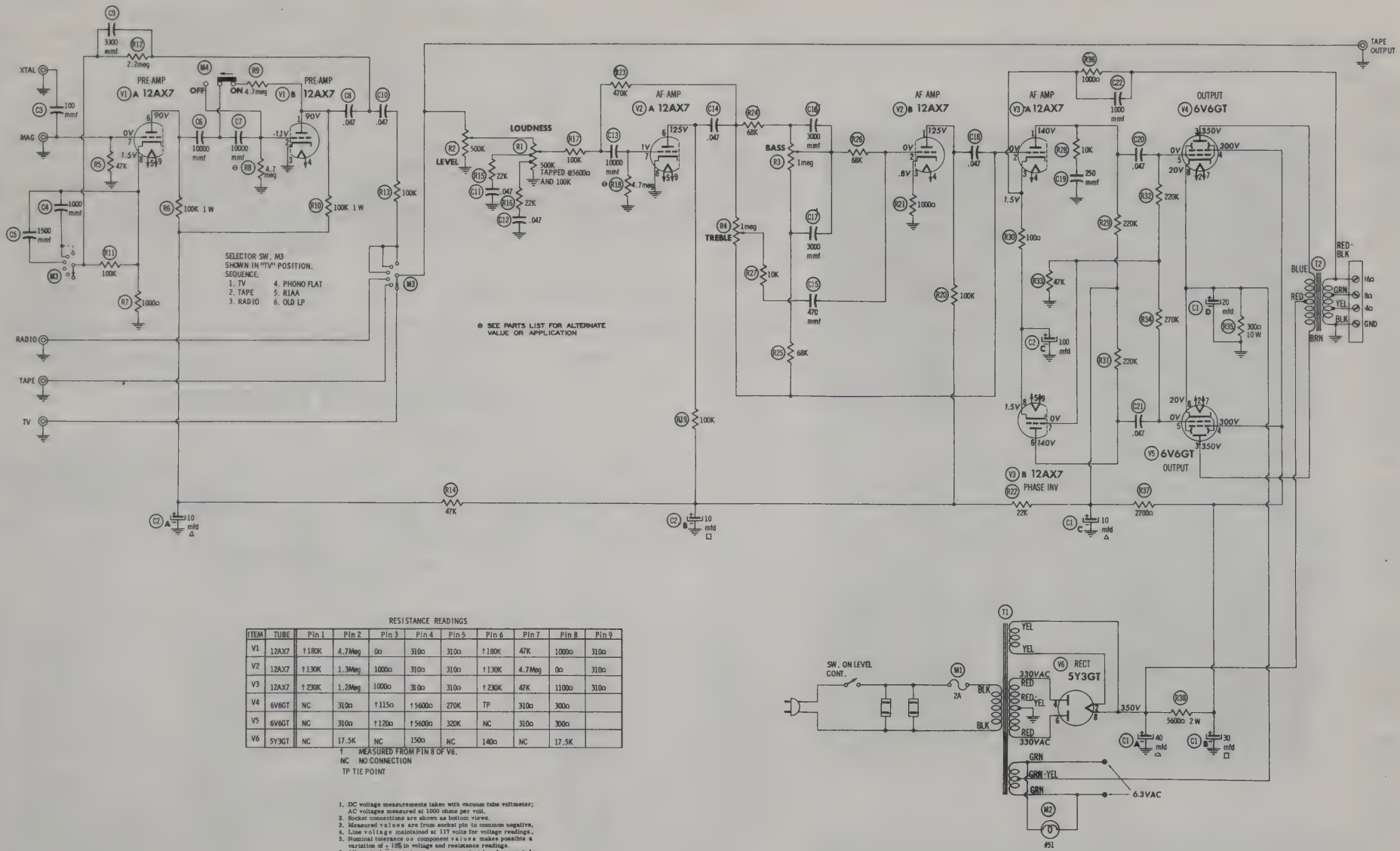
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			GROMMES PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V			312002. (3AG 2A)	342001	AGC 2	HKP

MISCELLANEOUS

ITEM No.	PART NAME	GROMMES PART No.	NOTES
M2	Pilot Light		#51
M3	Switch		Selector (2 Pole - 6 Position; Rotary, Wafer Type)
M4	Switch		Rumble Filter (SPDT - Slide Type)

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	↑180K	4.7Meg	0Ω	310Ω	310Ω	↑180K	47K	1000Ω	310Ω
V2	12AX7	↑130K	1.3Meg	1000Ω	310Ω	310Ω	↑130K	4.7Meg	0Ω	310Ω
V3	12AX7	↑230K	1.2Meg	1000Ω	310Ω	310Ω	↑230K	47K	1100Ω	310Ω
V4	6V6GT	NC	310Ω	↑115Ω	↑5600Ω	270K	TP	310Ω	300Ω	
V5	6V6GT	NC	310Ω	↑120Ω	↑5600Ω	320K	NC	310Ω	300Ω	
V6	5Y3GT	NC	17.5K	NC	150Ω	NC	140Ω	NC	17.5K	

↑ MEASURED FROM PIN 8 OF V6.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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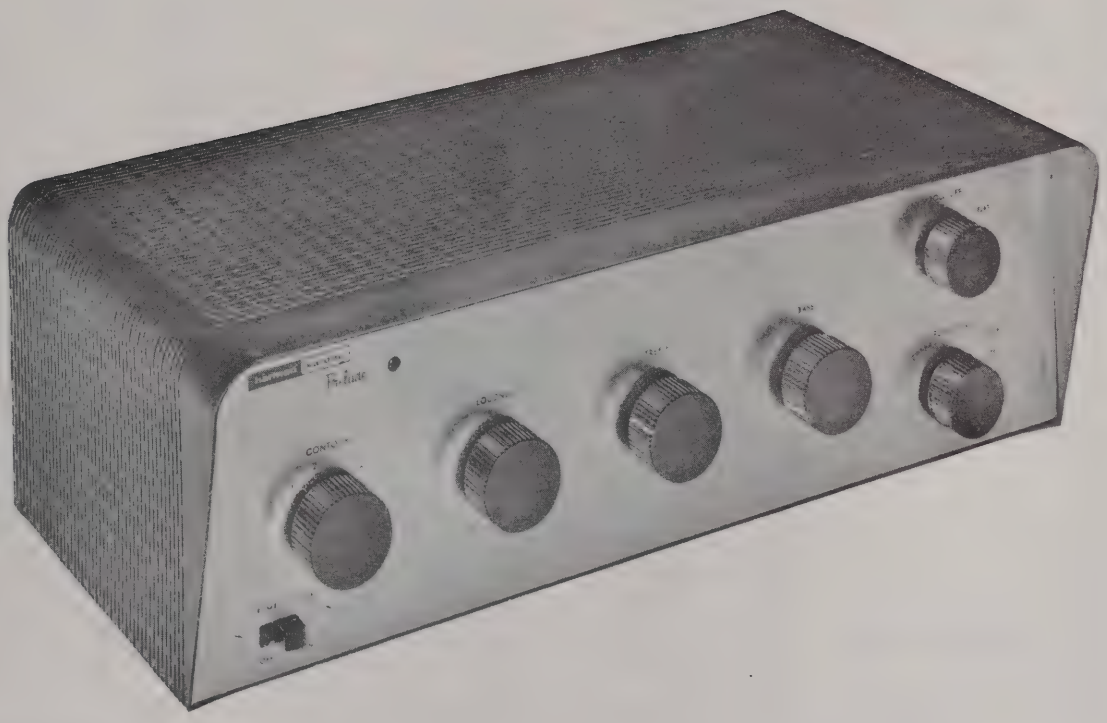
HARMAN-KARDON
MODEL PC-200



HARMAN-KARDON
MODEL PC-200

TRADE NAME	Harman-Kardon Model PC-200
MANUFACTURER	Harman-Kardon, Inc., 520 Main St. Westbury, L. I., N. Y.
TYPE SET	AC Operated Audio Amplifier
TUBES (FIVE)	Types 12AX7 Preamplifier, 12AX7 AF Amp. -Phase Inverter, (2) 6V6GT Output, 5Y3GT Rectifier
POWER SUPPLY	105-125 Volts AC - 60 Cycles RATING .47 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamplifier	12AX7	
V2	AF Amp. -Phase Inv.	12AX7	
V3	Output	6V6GT	
V4	Output	6V6GT	
V5	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Harman-Kardon PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	350	JE621281	AFH4-114-50	C104	FP437	TMT-140	T-535	TVL-4740
B	■20	350			BR2045	TC62	TD-20-350	FM-4520	TVA-1604
C	▲10	350							
D	100	50							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Harman-Kardon PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C3	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C4	2000			SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C5	1000			SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C6	270			SI270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C7	100			N750-DI100	TCN-100	N042	N750L-101	NT-531	5TCU-T1	
C8	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C9	4700			SI4700	D6-472	TP63	GP2-333-472	UC-5247	5HK-D47	
C10	4700			SI4700	D6-472	TP63	GP2-333-472	UC-5247	5HK-D47	
C11	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C12	10000			BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C13	4700			BPD-0047	D6-472	TP63	GP2-333-472	UC-5247	5HK-D47	
C14	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C15	.05	200	JB2-.05	BPD-05				PTS415	2SE-S47	
C16	.02	200		BPD-02	DF-203	CUB2S5	817-02	PT412	2TM-S2	
C17	.22	200	JB2-.22					PTS4022	2SE-P22	
C18	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C19	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C20	.047	600	JB6-.047	BPD-05	DF-503				6SE-S47	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Harman-Kardon PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	RV621264B	ABT-71				Loudness, Tapped ⓐ 200K
B	Shaft		Not Req.	AK-4				Attach to R1A
C	Switch		Not Req.	KB-1				Attach to R1A
R2A	25K	½	RV621262C	AB-29				Treble
B	Shaft		Not Req.	AK-4				Attach to R2A
R3A	250K	½	RV621263C	AB-51				Bass
B	Shaft		Not Req.	AK-4				Attach to R3A

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Harman-Kardon PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R4	47K			BTS-47K	
R5	270K			BTS-270K	
R6	820Ω			BTS-820	
R7	220K			BTS-220K	
R8	470K			BTS-470K	
R9	270K			BTS-270K	
R10	1500Ω			BTS-1500	
R11	100K			BTS-100K	
R12	68K			BTS-68K	
R13	1Meg			BTS-1Meg	
R14	68K			BTS-68K	
R15	47K			BTS-47K	
R16	270K			BTS-270K	
R17	6800Ω			BTS-6800	
R18	270K			BTS-270K	Note 1
R19	56K			BTS-56K	
R20	390Ω			BTS-390	
R21	12K			BTS-12K	
R22	270K			BTS-270K	Note 1
R23	1500Ω			BTS-1500	
R24	33K			BTS-33K	
R25	470K			BTS-470K	
R26	470K			BTS-470K	
R27	270Ω	2		BTB-270	
R28	1000Ω			BTS-1000	
R29	68Ω			BTS-68	
R30	68Ω			BTS-68	
R31	4.7Ω	1			

Note 1: Some versions use 220K in this application.

TRANSFORMER (POWER)

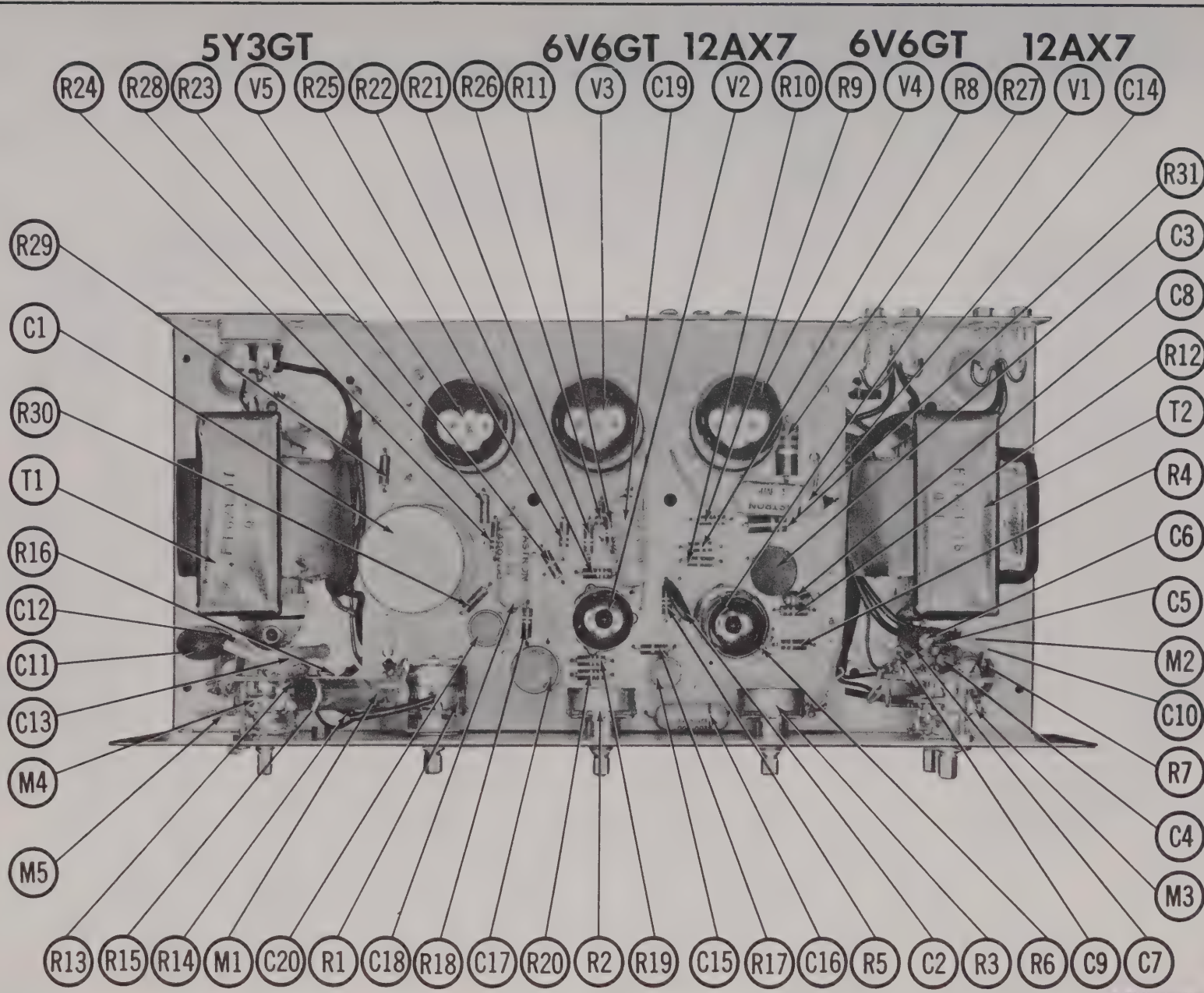
ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ⓐ .47A	580VCT ⓐ .070A	5VAC ⓐ 2A	6.3VAC ⓐ 1.45A	FT621217					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	7K	16Ω tap ⓐ 8Ω	FT621218						

MISCELLANEOUS

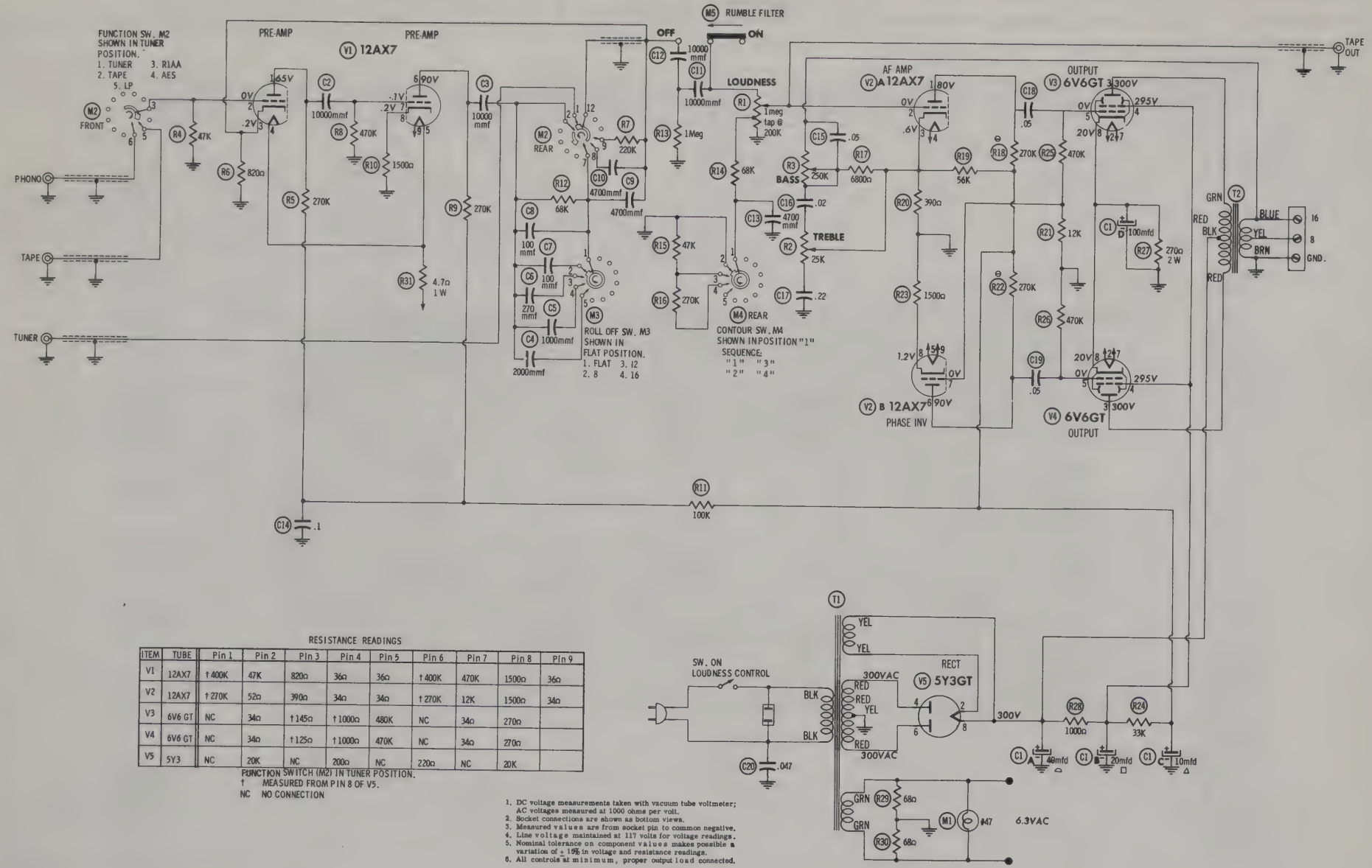
ITEM No.	PART NAME	Harman-Kardon PART No.	NOTES
M1	Pilot Light		#47
M2	Switch	ER621287	Function (Rotary, Wafer Type)
M3	Switch	ER621286	Roll Off (SP-4 Position; Rotary, Wafer Type)
M4	Switch	ER621286	Contour (SP-4 Position; Rotary, Wafer Type)
M5	Switch	ES621350	Rumble Filter (SPST - Slide Type)
	Cage	P66A1285	
	Knob	P20778	Large
	Knob	P22783	Small



CHASSIS-TOP VIEW

HARMAN-KARDON
MODEL PC-200

SET 335 FOLDER 8



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†400K	47K	820Ω	36Ω	36Ω	†400K	470K	1500Ω	36Ω
V2	12AX7	†270K	52Ω	390Ω	34Ω	34Ω	†270K	12K	1500Ω	34Ω
V3	6V6 GT	NC	34Ω	†145Ω	†1000Ω	480K	NC	34Ω	270Ω	
V4	6V6 GT	NC	34Ω	†125Ω	†1000Ω	470K	NC	34Ω	270Ω	
V5	5Y3	NC	20K	NC	200Ω	NC	220Ω	NC	20K	

FUNCTION SWITCH (M2) IN TUNER POSITION.
† MEASURED FROM PIN 8 OF V5.
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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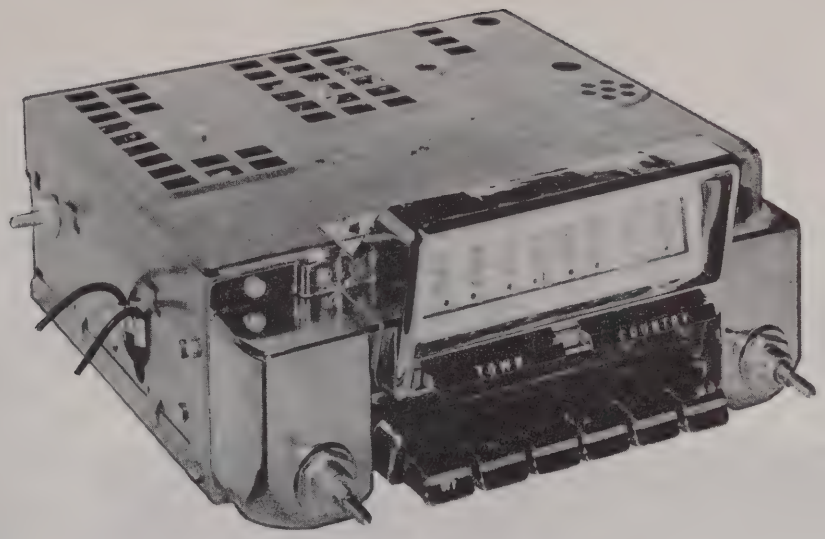
LINCOLN MODEL 6BH (FDU-18805-C),
MERCURY MODEL 6BMS (FDT-18805-D)



TRADE NAME	Lincoln Model 6BH (FDU-18805-C), Mercury 6BMS (FDT-18805-D)
MANUFACTURER	Bendix Radio, Div. of Bendix Aviation Corp., Baltimore 4, Md.
TYPE SET	Battery Operated Custom Built AM Superheterodyne Automobile Receiver
TUBES (Nine)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12AU6 IF Amplifier, 12AX7 Det.-AF Amplifier, 12AU7A Phase Inv.-Relay Control, (2) 12AQ5 Output, 12AV6 AVC-Trigger Amp., 12X4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 3.9 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Fig. 1	Thru dummy to antenna receptacle	265KC (400~Mod)	650KC	Across voice coil	A1, A2, A3, A4,	Adjust for maximum output.
2.	"	"	1605KC	High freq. end of dial	"	A5, A6, A7	"
3.	With radio installed in car and antenna fully extended, tune in a weak station near 1600KC, adjust A7 for maximum volume.						
	Following steps are necessary only in case of core or tuner coil replacement.						
4.				High freq. end of dial	Across voice coil	A8, A9, A10	Adjust tuner cores so that they remain in coil forms but out of coils.
5.	Fig. 1	Thru dummy to antenna receptacle	1605KC	"	"	A5, A6, A7	Adjust for maximum output in order given.
6.	"	"	1200KC	1200KC	"	A10, A9, A8	"
7.	"	"	1605KC	High frequency end of dial	"	A5, A6, A7	Adjust for maximum output in order given. Repeat steps 6 and 7, but adjust A8, A9 and A10 at 1200KC only.

PUSHBUTTON ADJUSTMENT

Pull pushbutton all the way out. Tune manually to desired station. Press pushbutton in firmly. Repeat on remaining pushbuttons.

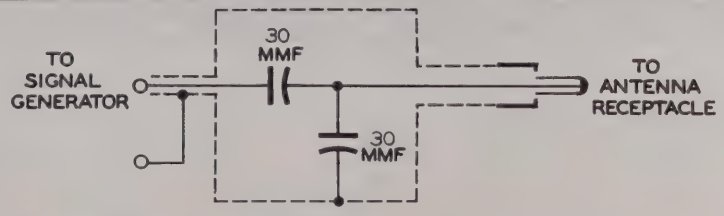


FIG. 1

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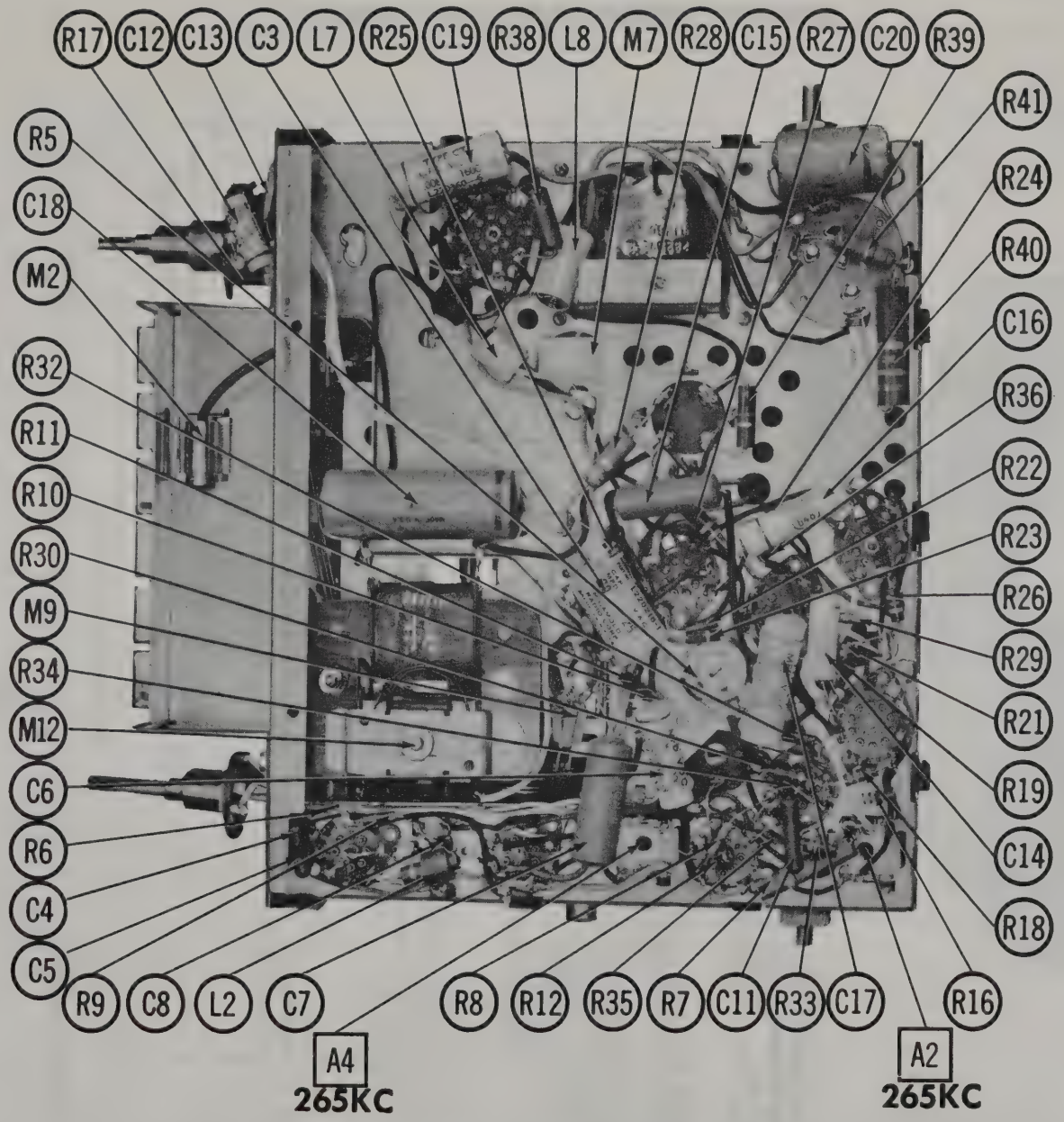


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12AU6	
V4	Det.-AF Amplifier	12AX7	
V5	Phase Inverter-Relay Cont.	12AU7A	

ITEM No.	USE	TYPE	NOTES
V6	Output	12AQ5	
V7	Output	12AQ5	
V8	AVC-Trigger Amplifier	12AV6	
V9	Rectifier	12X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BENDIX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲20	350		AFH4-99-95				Q-205	R2258 *
B	■10	300						MT-4540	
C	▲40	350							
D	20	25							
C2	40	350		PRS350V40	BR4035	TC78	TD-40-350	MT-4530	TVA-1611
C3	20	25VAC		PRS25VAC20	BR505 † BR505			MT-0250 † MT-0250	R2257 *

† Connect negative leads together.
* Non-catalog item.

FIXED CAPACITORS

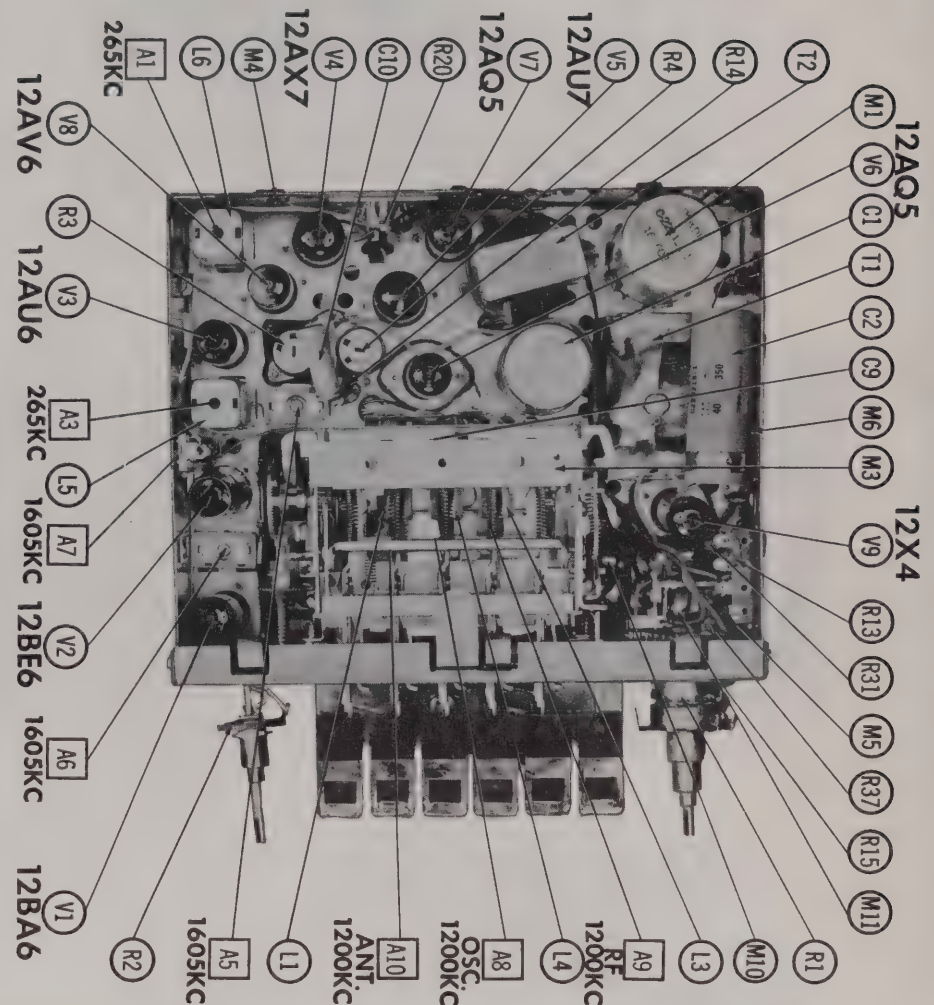
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA BENDIX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	120			SI120	D6-121	TP35	GP2K-121	UC-5312	5GA-T12	
C5	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C6	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C7	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C8	10			NP0-DI10	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C9	100			N750-DI100	TCN-100	N042	N750L-101	NT-531	5TCU-T1	
C10	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C11	150			SI150	D6-151	TP36	GP2K-151	UC-5315	5GA-T15	
C12	.005	200		SI5000	D6-502	CUB6D5	GP3-333-502	PT625	6TM-D5	
C13	3600									
C14	.0068	200		BPD-0068	D6-682	CUB6D68	GP3-333-682		6TM-D68	
C15	.02	400		BPD-02	DD-203	CUB4S2	817-02	PT412	4TM-S2	
C16	.02	200		BPD-02	DD-203	CUB2S2	817-02	PT412	2TM-S2	
C17	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C18	.3	600		P688N-33						
C19	.008	1600		P1688N-008	DD16-802	CUB16D8		PT1628	MB-D8	
C20	.5	100		VHC36		MP2P5		RF480	68P20	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA BENDIX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	Switch		N219676-1					Tone (Panel)
B	1Meg	½						Volume -tapped @300K(Rear)
R2	11.5Ω	2	L219679-1		RTV-572C			Fader-wirewound
R3	3000Ω	2			39-3000		FL-4K	Listen sensitivity- wirewound
R4	3000Ω	2			39-3000		FL-4K	Seeking sensitivity- wirewound
R5	3000Ω	2			39-3000		FL-4K	AVC Delay -wirewound

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	BENDIX PART No.	IRC PART No.	
R6	1Meg			BTS-1Meg	
R7	15K	2		BTB-15K	
R8	2.2Meg			BTS-2.2Meg	
R9	1Meg			BTS-1Meg	
R10	47K			BTS-47K	
R11	68Ω			BTS-68	
R12	68Ω			BTS-68	
R13	15K			BTS-15K	
R14	3900Ω			BTS-3900	Note 1
R15	82K			BTS-82K	
R16	470K			BTS-470K	Note 2
R17	33K			BTS-33K	Note 3
R18	8.2Meg 5%			BTS-8.2Meg 5%	Note 4
R19	15Meg			BTS-15Meg	
R20	1000Ω			BTS-1000	
R21	33Ω			BTS-33	
R22	10Meg			BTS-10Meg	
R23	220K			BTS-220K	
R24	220K			BTS-220K	
R25	470K			BTS-470K	
R26	470K			BTS-470K	
R27	3300Ω	1		BTA-3300	
R28	330Ω	1		BTA-330	
R29	2.2Meg			BTS-2.2Meg	
R30	10Meg 5%			BTS-10Meg 5%	
R31	33K	2		BTB-33K	
R32	1Meg			BTS-1Meg	
R33	150K			BTS-150K	
R34	2200Ω			BTS-2200	
R35	2.2Meg			BTS-2.2Meg	
R36	100Ω	1		BTA-100	Note 5
R37	12K	2		BTB-12K	
R38	2200Ω	1		BTA-2200	
R39	1000Ω	1		BTA-1000	
R40	180Ω	2		BTB-180	
R41	180Ω	1		BTA-180	

Note 1. Not used in some versions.
Note 2. Some versions use 100K in this application.
Note 3. Some versions use 56K in this application.
Note 4. This resistor may be any 5% value between 6.8Meg and 10Meg. Use value listed for replacement.
Note 5. Some versions use 560Ω in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	BENDIX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12.6VCT @2.3A	530VCT @.065A			C282975-2	V3903	P-2978	P-6489	22R52	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	BENDIX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	9.7KΩ	3-4Ω	C291798-2	Z1000	A-2938	A-3850	24S60	S-17X	

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	BENDIX PART No.	QUAM PART No.	RCA TYPE No.	
SP1	6" x 9"	PM	3-4Ω	L222088-2	69A2	238S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	BENDIX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	15Ω						Part of M3
L2	RF Choke	30Ω					4652 *	1090 Microhenries, wound on 15K, 1W resistor
L3	RF Coil	12Ω						Part of M3
L4	Osc. Coil	.6Ω	3Ω					Part of M3
L5	Input IF	55Ω	48Ω	L291806-1			12-H1	
L6	Output IF	48Ω	44Ω	L291807-4			12-H6	
L7	Fil. Choke	.4Ω						118 Microhenries
L8	Vib. Hash Choke	.2Ω						14 Microhenries

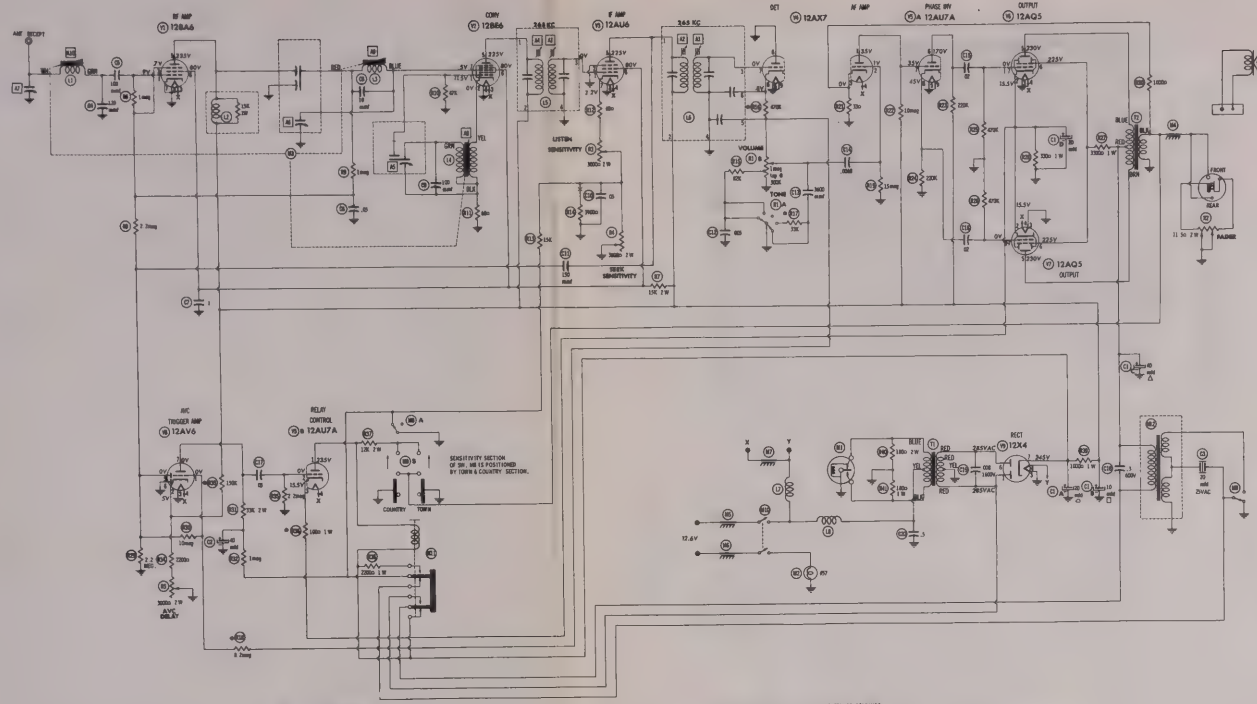
* Parallel with 15K, 1W resistor.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				BENDIX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12.6V	115∿	C221139-1	6330	G883	6330	

MISCELLANEOUS

ITEM No.	PART NAME	BENDIX PART No.	NOTES
M2	Dial Light		#57
M3	Tuner	220968-1	Permeability, includes L1, L3, L4
M4	Spark Plate		Speaker
M5	Spark Plate		Power Input Lead
M6	Spark Plate		Dial Light Lead
M7	Spark Plate		Filament
M8A	Switch		Seeking sensitivity
B	Switch		Seek Bar
M9	Switch		Motor reversing (SPDT)
M10	Switch		Off (power) DPDT
M11	Relay		
M12	Motor	L221137-1	Includes field coil and shading coils
A5	Trimmer Cap.	L219090-2	Osc. (315-385MMF) Includes 100MMF fixed capacitor
A6	Trimmer Cap.	L219090-1	RF (5-80MMF) Includes 22 & 270MMF fixed capacitors
A7	Trimmer Cap.	C219083-1	Ant. (4-75MMF)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BA6	5.4Meg	4.4Meg	1Ω	0Ω	↑100Ω	1.1K	0Ω		
V2	12BE6	47K	68Ω	1Ω	0Ω	↑100Ω	↑1K	5.3Meg		
V3	12AU6	46Ω	0Ω	0Ω	1Ω	↑100Ω	↑1K	1MΩ		
V4	12AX7	↑10Meg	1.5Meg	33Ω	1Ω	0Ω	0Ω	42Ω	1.5Meg	NC
V5	12AU7	↑700Ω	2.2Meg	470Ω	1Ω	0Ω	↑ 215K	↑10Meg	220K	NC
V6	12AQ5	470K	70Ω	0Ω	1Ω	↑ 400Ω	↑ 340Ω	470K		
V7	12AQ5	470K	70Ω	0Ω	1Ω	↑ 370Ω	↑ 340Ω	470K		
V8	12AV6	5Meg	300Ω	0Ω	1Ω	2.2Meg	0Ω	1Meg		
V9	12AU6	360Ω	TP	0Ω	1Ω	TP	390Ω	15K		

↑ MEASURES FROM PIN 7 OF V4
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with Sencore tube voltmeter, AC voltages measured at 1000 cycles per sec.
2. Resistor measurements are shown as ballast values.
3. Measured voltages are taken from socket pin to chassis negative.
4. Battery voltage measured with 6 volts for voltage readings.
5. Voltages and resistance values may vary slightly between a variation of ± 10% in voltage and resistance readings.
6. Values noted at oscillators, no signal applied for voltage measurements.

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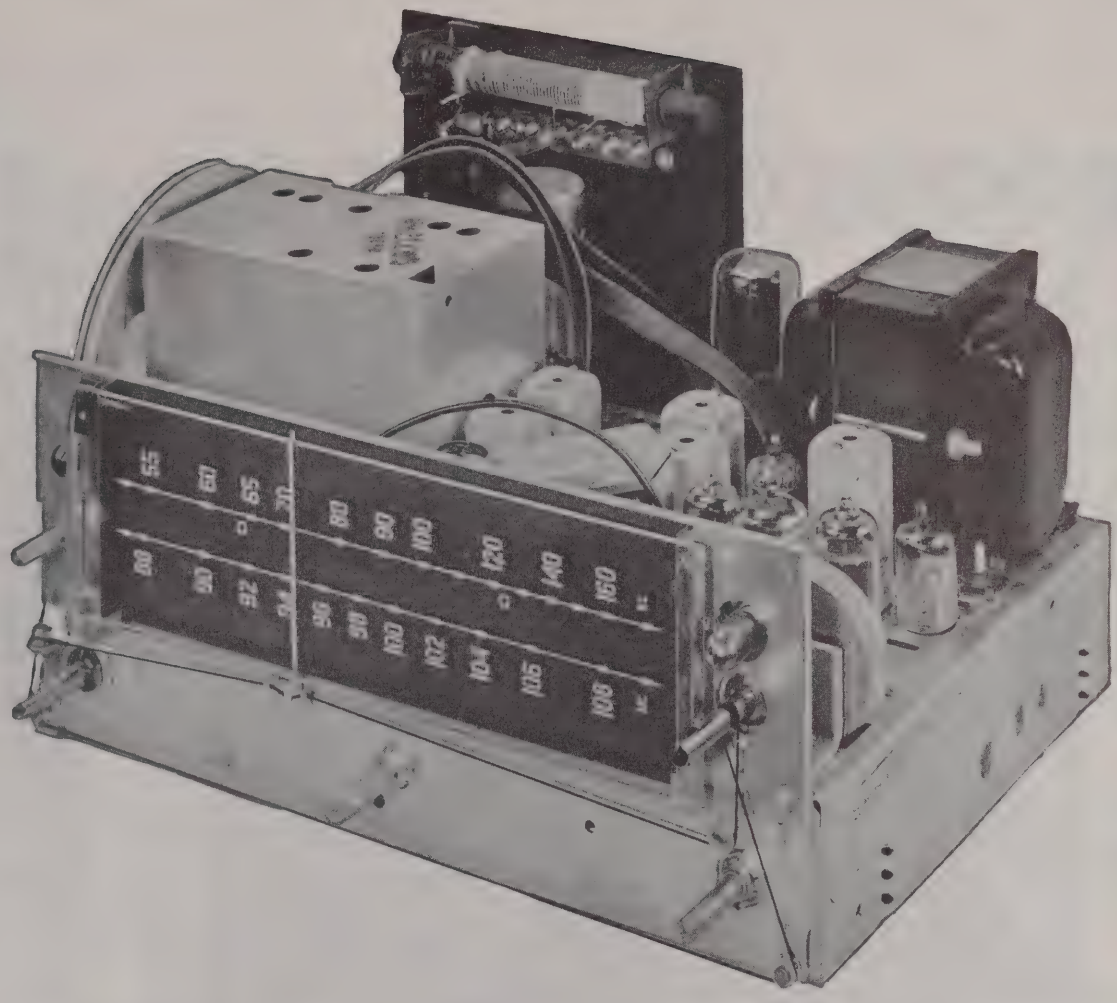
MAGNAVOX
CHASSIS CR-717

MAGNAVOX
CHASSIS CR-717



MAGNAVOX
CHASSIS CR-717

TRADE NAME	Magnavox Chassis CR-717	
MANUFACTURER	Magnavox Co., 2131 Bueter Rd., Fort Wayne, Ind.	
TYPE SET	AC Operated FM-AM Superheterodyne Receiver	
TUBES	Ten	
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING .77 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540KC-1620KC	FREQ. MOD. 88MC-108MC

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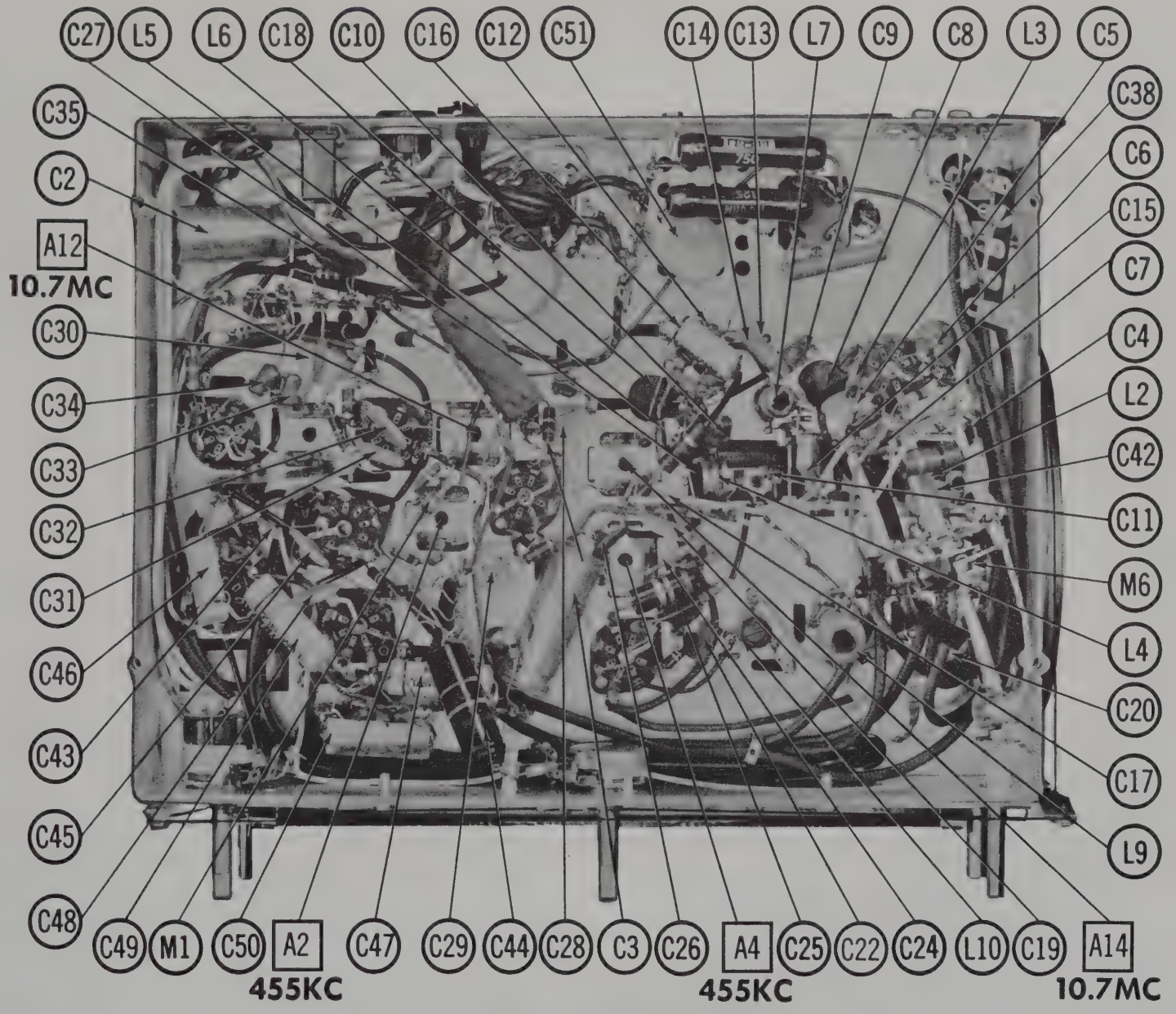
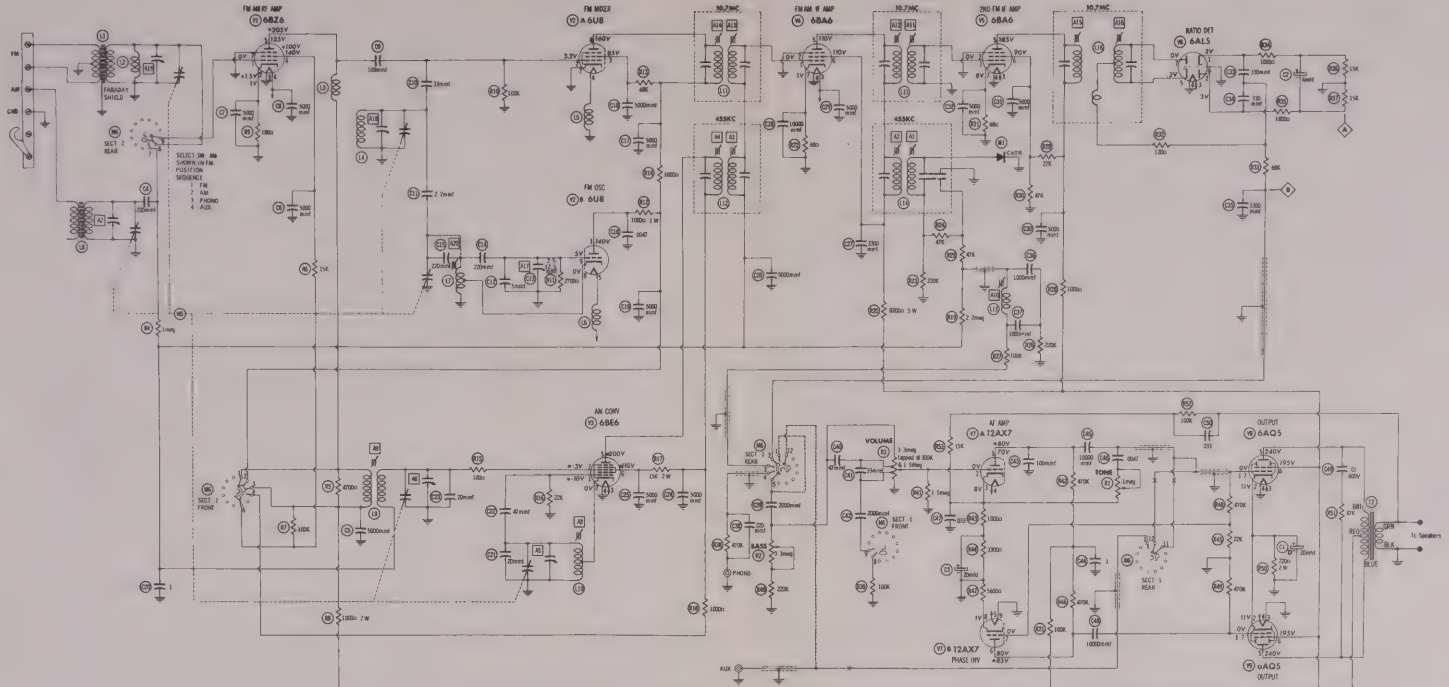


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	∞ 3.3Meg	180Ω	0Ω	.1Ω	† 180Ω	∞ † 117K	0Ω		
V2	6U8	† 280Ω	100K	† 70K	2Ω	3Ω	† 280Ω	0Ω	0Ω	270Ω
V3	6BE6	∞ 22K	∞ 5Ω	1Ω	0Ω	∞ † 280Ω	∞ † 18K	∞ 2.3Meg		
V4	6BA6	2.3Meg	0Ω	.1Ω	0Ω	† 900Ω	† 900Ω	68Ω		
V5	6BA6	0Ω	0Ω	1Ω	0Ω	† 180Ω	† 7kK	68Ω		
V6	6AL5	16K	17K	1Ω	0Ω	1MF	0Ω	1MF		
V7	12AX7	† 570K	1.5Meg	430Ω	.1Ω	.1Ω	† 570K	22K	560Ω	0Ω
V8	6AQ5	4MΩ	220Ω	1Ω	0Ω	† 280Ω	† 900Ω	NC		
V9	6AQ5	NC	220Ω	0Ω	1Ω	† 280Ω	† 900Ω	47Ω		
V10	5Y3GT	NC	22K	NC	85Ω	TP	78Ω	NC	22K	

ALL MEASUREMENTS TAKEN IN FM POSITION UNLESS OTHERWISE DESIGNATED
† MEASURED FROM PIN 8 OF V10
∞ MEASURED IN AM POSITION.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with electronic tube voltmeter between point indicated and chassis ground.
2. Actual measurements are shown above each note.
3. Measured with a 6 ft AM tube socket jig to eliminate capacitive tube voltage variations at 117 volts for voltage readings.
4. Practical tolerance is component values plus or minus 20% and resistance readings plus or minus 10%.
5. Variations in readings are to be expected due to manufacturing tolerances.
6. Values shown are maximum no signal applied.

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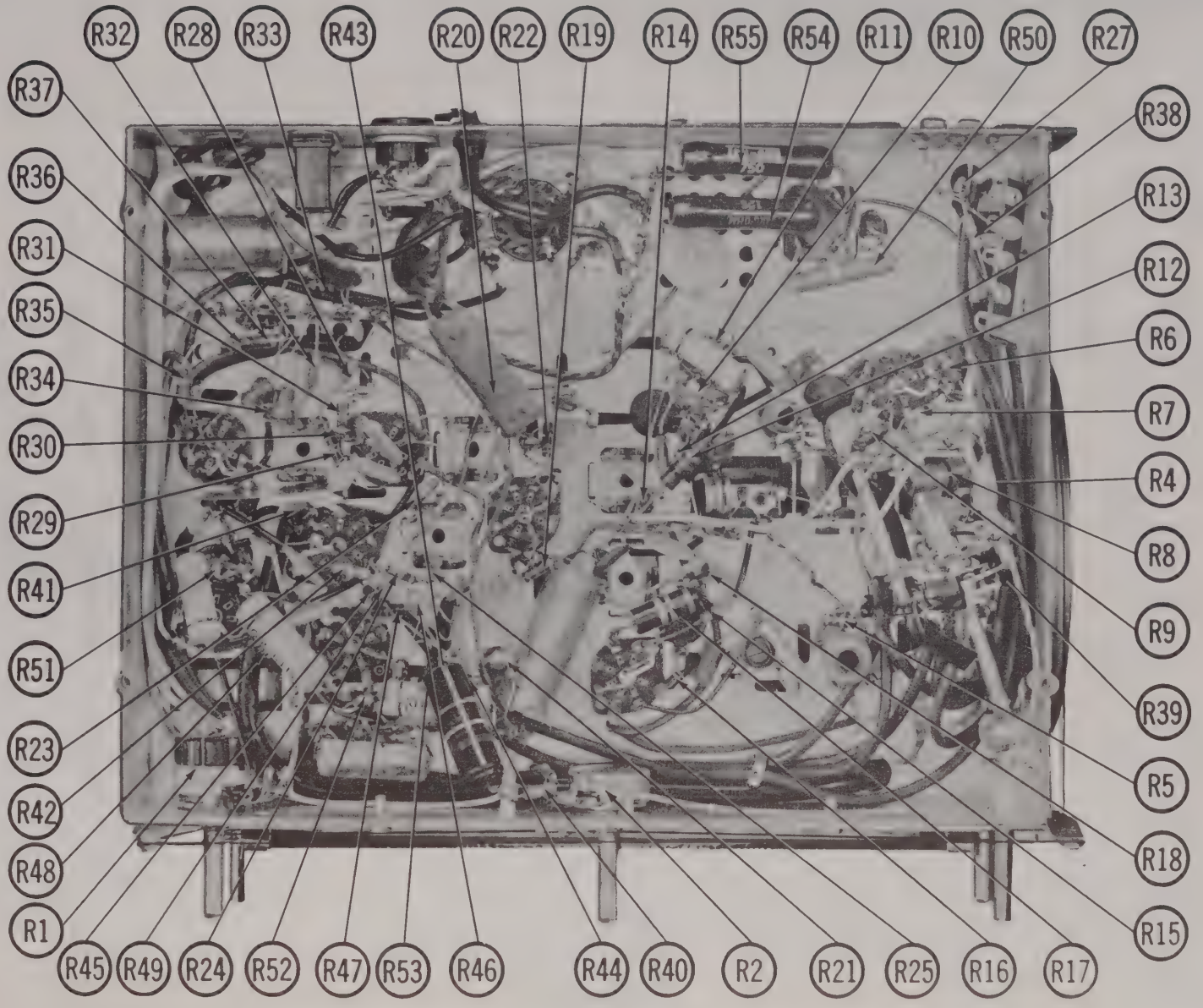


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

MAGNAVOX
CHASSIS CR-717

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	455KC (400∿Mod)	AM	100KC	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	10MMF	High side to AM antenna terminal. Low side to chassis.	1400KC	"	1400KC	"	A5, A6, A7	"
3.	"	"	600KC	"	600KC	"	A8, A9	"

10KC FILTER ADJUSTMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
4.	Direct	Connect audio oscillator across phono jack	10KC	Phono		Across voice coil	A10	Adjust for MINIMUM output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to pin 2 (grid) of 6U8 (V2). Low side to chassis.	10.7MC (Unmod)	FM	Low freq. end of dial.	DC probe thru 1Meg to point (A). Common to chassis.	A11, A12 A13, A14 A15	Adjust for maximum deflection.
6.	"	"	"	"	"	DC probe thru 1Meg to point (B). Common to chassis.	A16	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 5 and 6.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD in series with 1000Ω carbon resistor	High side to pin 2 (grid) of 6U8 (V2). Low side to chassis.	10.7MC (300KC Swp)	FM	Low freq. end of dial	Vert. Amp. thru 1Meg to point (A). Low side to chassis.	A11, A12 A13, A14 A15	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
6.	"	"	"	"	"	Vert. Amp. thru 1Meg to point (B). Low side to chassis.	A16	Reconnect stabilizing capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A15 for maximum amplitude and straightness of crossover lines. Repeat steps 5 and 6.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	120Ω, 150Ω Carbon resistors	To FM antenna terminals with 120Ω in high side and 150Ω in low side.	107MC	FM	107MC	DC probe thru 1Meg to point (A). Common to chassis.	A17, A18, A19	Adjust for maximum deflection.
8.	"	"	89MC	"	89MC	"	A20	Adjust for maximum deflection. Repeat steps 7 and 8.

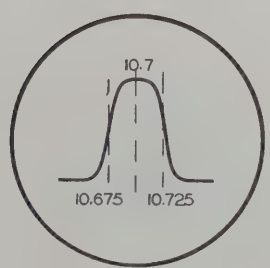


FIG. 1

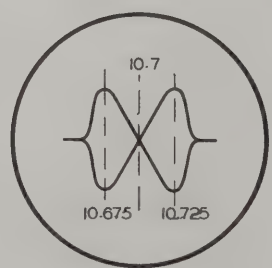


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BZ6	
V2	FM Mixer-Oscillator	6U8	
V3	AM Converter	6BE6	
V4	1st. IF Amplifier	6BA6	
V5	2nd. FM IF Amplifier	6BA6	

ITEM No.	USE	TYPE	NOTES
V6	Ratio Detector	6AL5	
V7	AF Amp.-Phase Inv.	12AX7	
V8	Output	6AQ5	
V9	Output	6AQ5	
V10	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

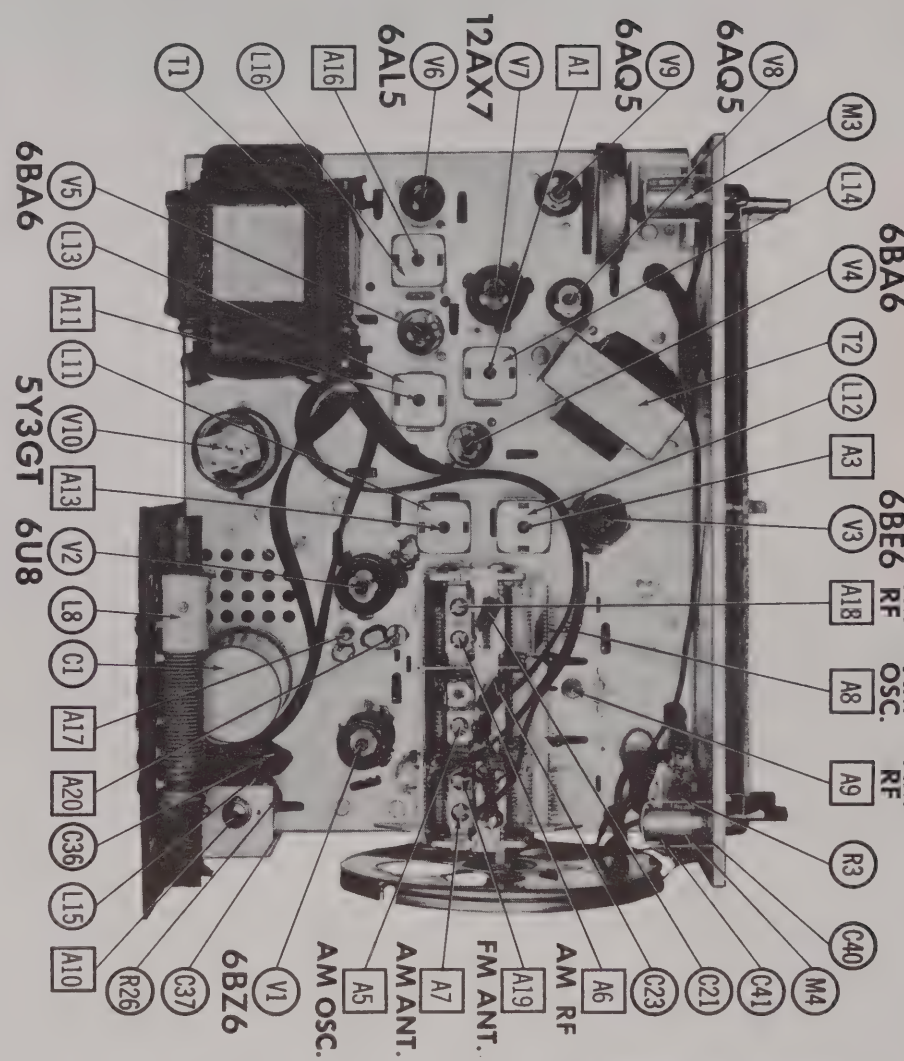
ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲35	450	270021-59	AFH4-76	D082	FP430.2	TMQ-90	Q-370	TVL-4732
B	▲20	450							
C	■30	450							
D	20	25							
C2	4	50	270027-27	SRE50V5	BR550	TC30	TD-4-50	MMT-0550	TVA-1303
C3	20	25	270027-2	PRS25V25	BR202	TC26	TD-25-25	FM-0225	TVA-1205

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	220	500	250187-57	NP0-SI220	D6-221	22R5T22	811-221		MS-322	
C5	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C6	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C7	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C8	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C9	100	500	250187-53	NP0-SI100	D6-101	22R5T1	801-101	MCB235	MS-31	
C10	33	500	250187-47	NP0-SI33	D6-330	22R5Q33	NP0K-330	ZT-5433	MS-433	
C11	2.2		250221-118	NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C12	5		250088-138							
C13	2.5-12.5		250188-9							
C14	220	500	250159-55	1469-00022		22R5T22	NP0-335-221		MS-322	
C15	220	500	250159-55	1469-00022		22R5T22	NP0-335-221		MS-322	
C16	.0047	400	250211-5	BPD-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C17	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C18	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C19	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C20	.1	200	250202-13	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C21	20	500	250187-5	NP0-SI20	TCZ-20	22R5Q22	NP0K-200	ZT-542	MS-42	
C22	47	500	250187-49	NP0-SI47	TCZ-47	22R5Q47	NP0-338-470	ZT- 545	5TCC-Q47	
C23	20	500	250187-5	NP0-SI20	TCZ-20	22R5Q2	NP0K-200	ZT-542	MS-42	
C24	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C25	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C26	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C27	3300		250175-28	BPD-0033	D6-332	K077	811-0033	UC-5233	5HK-D33	
C28	10000		250218-19	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C29	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C30	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C31	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C32	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C33	330		250207-49	SI330	D6-331	TP43	811-331	UC-5333	5GA-T33	
C34	330		250207-49	SI330	D6-331	TP43	811-331	UC-5333	5GA-T33	
C35	3300		250175-28	BPD-0033	D6-332	K077	811-0033	UC-5233	5HK-D33	
C36	1000		250228-354	1464-001		1R5D1		MCE255	MS-21	
C37	1000		250228-354	1464-001		1R5D1		MCE255	MS-21	
C38	220		250218-5	DI-00022	D6-221	G051	811-221	UC-5322	5GA-T22	
C39	2000		250218-50	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C40	47		250218-17	N750-DI47	TCN-47	N033	N750K-470	NT-5447	5TCU-Q47	
C41	33		250218-21	N750-DI33	TCN-33	N029	N750K-330		5TCU-Q33	
C42	2000		250218-20	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C43	100		250218-22	BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C44	.1	400	250211-13	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C45	10000		250218-19	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C46	.0047	400	250211-5	BPD-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C47	.033	200	250202-10	BPD-03	DF-303	CUB4S33		PT4133	4TM-S33	
C48	10000		250218-19	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C49	.01	600	250201-7	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C50	.033	200	250202-10	BPD-03	DF-303	CUB4S33		PT4133	4TM-S33	
C51A	10000	1000	250219-3	P1088N-01		CUB16S1		PT611	10TM-S1	
B	10000	1000		P1088N-01		CUB16S1		PT611	10TM-S1	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	220073-20	AB-70	A47-1Meg-Z	Q13-137	U53	Tone
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A
R2A	3.3Meg	½	220072-27	AB-862	A47-4Meg-Z	Q13-140	U57	Bass
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R2A
R3	3.3Meg	½	D220131G3					Volume

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R4	1Meg		230104-98	BTS-1Meg	
R5	4700Ω		230104-70	BTS-4700	
R6	15K		230104-76	BTS-15K	
R7	100K		230104-86	BTS-100K	
R8	1000Ω	2	230096-62	BTB-1000	
R9	180Ω		230104-53	BTS-180	
R10	100K		230104-86	BTS-100K	
R11	2700Ω		230104-67	BTS-2700	
R12	1000Ω	1	230105-62	BTA-1000	
R13	68K		230104-84	BTS-68K	
R14	1000Ω		230104-62	BTS-1000	
R15	100Ω		230104-50	BTS-100	
R16	22K		230104-78	BTS-22K	
R17	15K	2	230106-76	BTB-15K	
R18	1000Ω		230104-62	BTS-1000	
R19	2.2Meg		230104-102	BTS-2.2Meg	
R20	8200Ω	5	240071-13	PW7-8200	
R21	100K		230104-86	BTS-100K	
R22	68Ω		230104-48	BTS-68	
R23	220K		230104-90	BTS-220K	
R24	47K		230104-82	BTS-47K	
R25	47K		230104-82	BTS-47K	
R26	220K		230104-90	BTS-220K	
R27	100K		230104-86	BTS-100K	
R28	1000Ω		230104-62	BTS-1000	
R29	22K		230104-78	BTS-22K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MAGNAVOX PART No.	IRC PART No.	
R30	47K		230104-82	BTS-47K	
R31	68Ω		230104-48	BTS-68	
R32	120Ω		230104-51	BTS-120	
R33	68K		230104-84	BTS-68K	
R34	1000Ω		230104-62	BTS-1000	
R35	1800Ω		230104-65	BTS-1800	
R36	15K		230104-76	BTS-15K	
R37	15K		230104-76	BTS-15K	
R38	470K		230104-94	BTS-470K	
R39	100K		230104-86	BTS-100K	
R40	220K		230104-90	BTS-220K	
R41	1.5Meg		230104-100	BTS-1.5Meg	
R42	470K		230104-94	BTS-470K	
R43	1000Ω		230104-62	BTS-1000	
R44	3300Ω		230104-68	BTS-3300	
R45	22K		230104-78	BTS-22K	
R46	470K		230104-94	BTS-470K	
R47	5600Ω		230104-71	BTS-5600	
R48	470K		230104-94	BTS-470K	
R49	470K		230104-94	BTS-470K	
R50	220Ω	2	230106-54	BTB-220	
R51	47K		230104-82	BTS-47K	
R52	100K		230104-86	BTS-100K	
R53	15K		230104-76	BTS-15K	
R54	125Ω	10	240021-11	1 3/4A-125	
R55	750Ω	10	240021-46	1 3/4A-750	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @.77A	550VCT @.104A	5VAC @ 2A	6.3VAC @3.2A	300081-1					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6.5K		330039-1	Z1007	A-2901	A-3823	24S61	S-53X	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

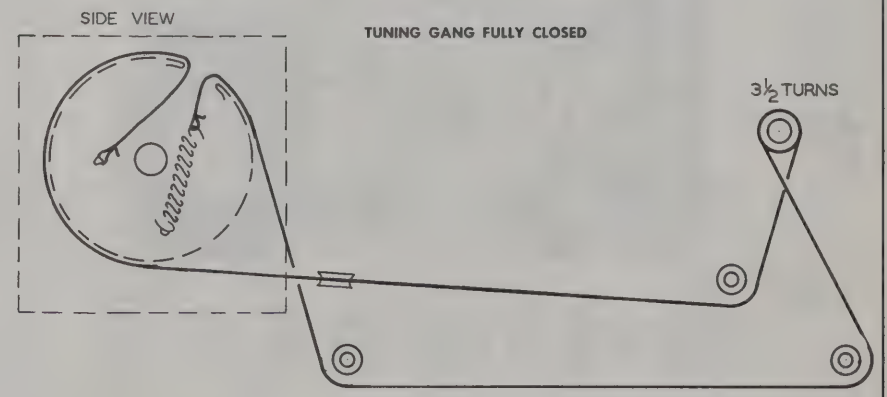
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Trans	.6ΩCT	0Ω	360491-2				
L2	FM Ant. Coil	0Ω		360629-1				
L3	RF Choke	.2Ω		360522-9	19-1002		4606	2 Microhenries
L4	FM RF Coil	0Ω		360629-1				
L5	Fil. Choke	.2Ω		360522-9	19-1002		4606	2 Microhenries
L6	Fil. Choke	.2Ω		360522-9	19-1002		4606	2 Microhenries
L7	FM Osc. Coil	0Ω		360628-1				
L8	AM Loop Stick	.6Ω		460894-1				
L9	AM RF Coil	23Ω	3.5Ω	360348-2			*A-5495-RF	* Enlarge mtg. hole. Tapped @.5Ω
L10	AM Osc. Coil	5.3Ω		360407-2	14-1033			
L11	1st. FM IF	.6Ω	.6Ω	360626-1	16-3487	FM-254	1463	
L12	1st. AM IF	16Ω	16Ω	360611-1	16-6758	BC-352	12-C1	
L13	2nd. FM IF	.6Ω	.6Ω	360626-1	16-3487	FM-254	1463	
L14	2nd. AM IF	27Ω	27Ω	360625-1	16-6770	BC-355	12-C6	
L15	10KC Filter	480Ω		360621-1				
L16	Ratio Det.	4.4Ω	1.5ΩCT	360627-1	17-3498	FM-255	1465	Tertiary winding-.6Ω

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		MAGNAVOX PART No.	SYLVANIA PART No.	
M1	1N34A	530030-2	1N34A	Audio Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M2	Pilot Light	180161-6	#44
M3	Dial Light	180161-17	#1847. Some versions use type #44 Lamp (Part #180161-6)
M4	Dial Light	180161-17	#1847. Some versions use type #44 Lamp (part #180161-6)
M5	Tuning Cap.	260133-1	6 Gang (AM Sections: 19-535MMF, 19-535MMF, 15-185MMF)
M6	Switch	160255-1	Selector (Rotary, wafer type)
	Dial Glass	150423-1	
	Dial Pointer	102448-2	



DIAL CORD STRINGING

MIRAPHON
MODELS XM110, XM110A

MIRAPHON
MODELS XM110, XM110A

GENERAL INFORMATION

The Miraphon Model XM 110A Manual Record Player incorporates the latest achievements in phonographic engineering and offers high-fidelity reproduction that fills the most exacting demands of the music connoisseur. The three-speed drive is arranged for 33 1/3, 45, and 78 rpm. The specially designed 4-pole motor with a high constant speed factor is mounted in vibration - free bearings and totally screened to prevent outside interference.

The tone arm is suspended in ball bearings, thus eliminating any displacement of the stylus, and guarantees equal pressure of the stylus. The plug-in head of the tone arm is so dimensioned that any commercial cartridge will fit.

The Exploded View on Page 5 shows all parts of the new manual record player XM 110A. Not all parts are identical with those of the old type XM 110 and will be noted on the spare parts list as indicated below:

+ Parts indicated with "+" are fully exchangeable with parts originally used in the XM 110.

++ All parts marked with "++" are also used for the record changer Miracord XA 100.

AUDIOGERSH CORPORATION

514 BROADWAY, NEW YORK, N.Y.

EXCLUSIVE DISTRIBUTORS IN THE U. S. FOR ELAC RECORD PLAYERS

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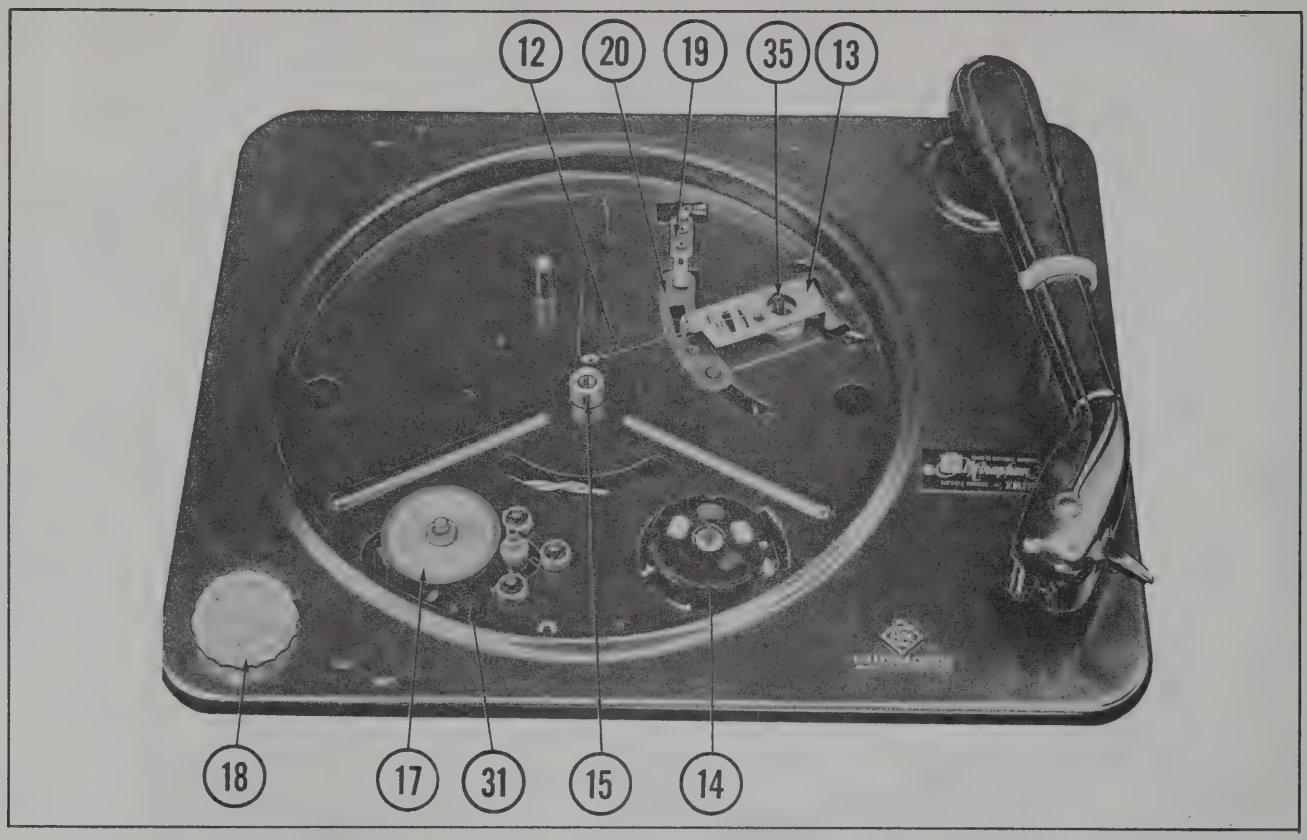


Figure 1

SPECIFICATIONS

Power Requirements-

110/220 volts, 60 cycle, AC current. 50 cycle can also be furnished if specified.

Chassis Dimensions-

12 1/2" x 10 1/4".

Height Above Mounting Plate-

2 1/2".

Height Below Mounting Plate-

2 1/4".

Clearance Above Mounting Plate-

4 1/3".

Clearance Below Mounting Plate-

2 3/4".

Weight-

Approximately 7 lbs.

PREPARING FOR OPERATION

Connection To Line-

This record player must not be connected to any other than AC supply, 110/220 volts. All units are set for 110 volts at the factory. If 220 volt operation is desired, change the voltage selector (14) which is located under the turntable. (Lift selector disc, set it for correct voltage, and press down again.) To remove the turntable, set the speed control knob (18) on "0" and lift the turntable straight up and off the spindle.

Connection To Preamplifier Or Equalizer-

Connection is made via a pickup lead, to the end of which a coaxial plug is attached. The capacitance of the pick-up lead should not exceed 200mmf.

OPERATING INSTRUCTIONS

NOTE: Always take care when setting the speed control knob and stylus selector, otherwise both record and stylus may be damaged.

Setting Speed Control Knob (18)-

Turn speed control knob (18) for correct speed as follows:

1. To 78 rpm for standard records of 10" or 12" diameter.

2. To 45 rpm for micro-groove records of 7" diameter.

3. To 33 rpm for micro-groove (LP) records of 10" or 12" diameter.

IMPORTANT: When the record player is not in use, always place speed selector knob (18) on position "0" to eliminate the possibility of a flat spot developing on the rubber tire of idler wheel (17).

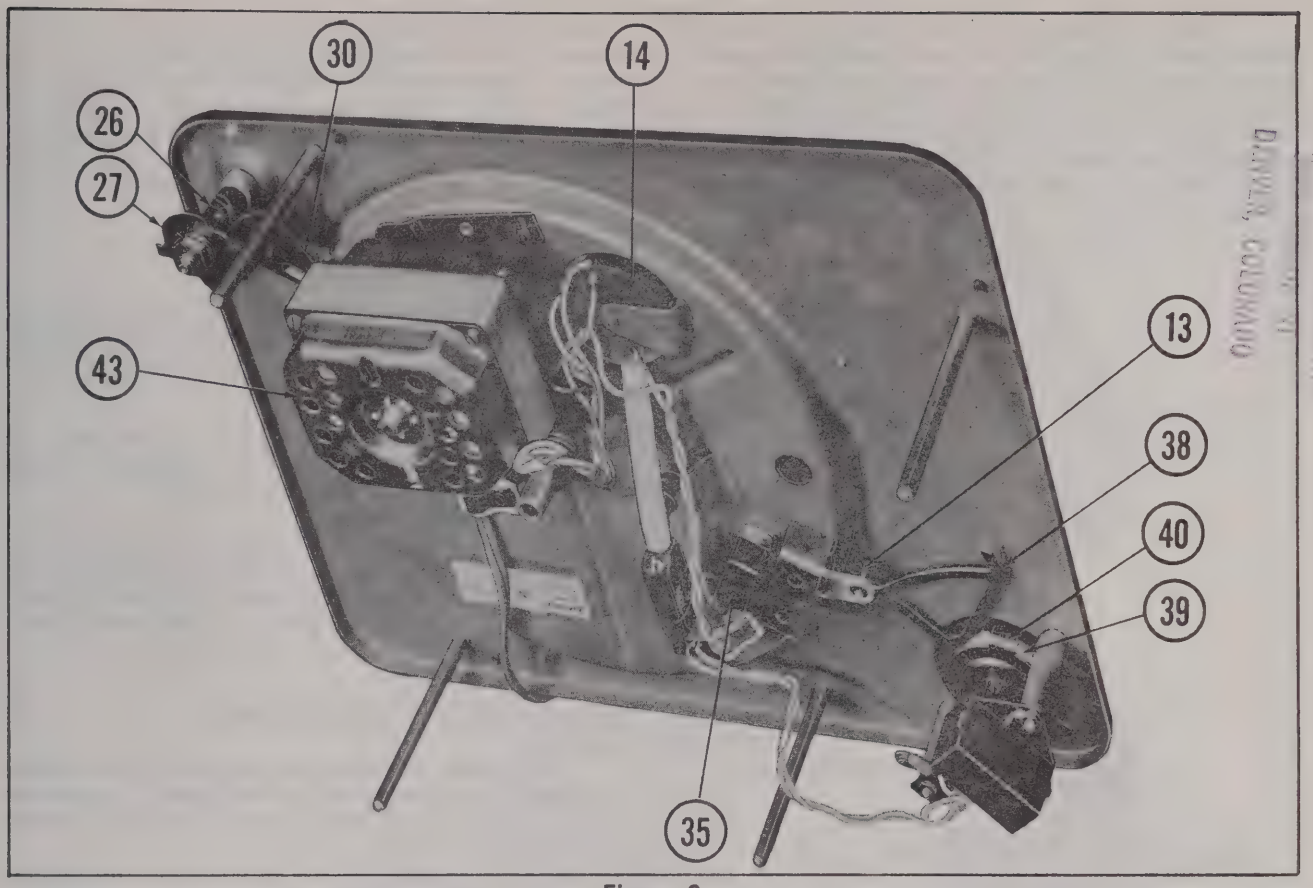


Figure 2

Setting The Stylus-

The plug-in head (7) is designed to fit all cartridges with standard 1/2" mounting centers.

For the shaft of turnover cartridges a knock-out is provided at the front end of the head. When using the Magnetic Cartridge Elac MST2, the small radius of the knob must point down when playing micro-groove records, for standard groove records the long radius must point down.

The plug-in head has another knock-out on the top for use of the "General Electric" cartridge. The push-on knob for this cartridge must be set with the round side to the front for standard groove records, and with the pointed end to the front for micro-groove records.

Switching On-

After placing a record on the turntable, the tone arm is moved to its extreme right. Wait until the turntable has made about half a revolution, then carefully place the tone arm on the lead-in groove. When playing 7" records with a large center hole, use the adaptor.

Switching Off-

When a record has been completed, the Miraphon XM110A is automatically switched off. At the same time the muting switch is closed to cut off any noise from the tone arm. The Miraphon can also be manually switched off by turning the tone arm slowly towards the center of the turntable.

HOW PLAYER FUNCTIONS

Drive-

The player is driven by a asynchronous AC motor (43), on the shaft of which a 3-step pulley is mounted. The idler wheel (17) is adjusted to ride on the different steps of the drive pulley by the idler pivot lever (30) and the speed change worm (26), when speed control knob (18) is turned.

Start, Muting, And Stop Functions-

When the tone arm is moved to the extreme right, segment (38) swings counter-clockwise and contacts the stud on the rear of switch lever (13). This action pivots the switch lever (13) in a clockwise direction and actuates muting switch cam (20), which in turn, closes muting switch (19) and the pick-up cartridge becomes "live".

Simultaneously, switch lever (13) actuates the toggle on motor on-off switch (35), energizing the motor.

This record player is provided with a velocity type shut-off mechanism which functions as follows:

As the stylus tracks across a record the segment (38) is moved inward, by action of the weighted friction clutch on the tone arm shaft, until it contacts the stud on the rear of switch lever (13). This action moves the switch lever (13) and the tracer spring (12) slowly toward the turntable hub. During each revolution of the turntable, the felt covered stud on the underside of the turntable contacts the front edge of tracer spring (12) and moves it back a slight amount.

When the stylus enters the "lead-out" groove at the end of the record, the tone arm, and consequently, tracer spring (12) accelerate rapidly toward the turntable hub. This permits the felt covered stud on the underside of the turntable to move in behind the tracer spring (12) and pivot the switch lever (13) in such a manner so as to open muting switch (19) and motor on-off switch (35).

Figure 3

ADJUSTMENTS

Stylus Pressure Adjustment-

The stylus pressure depends upon the data for the cartridge used, however, in consideration of the mechanism of the player, must not be less than 6 grams.

The stylus pressure can be adjusted by turning the knurled nut (See Figure 3) in the tone arm.

Turning into direction A = stylus pressure decreases.

Turning into direction B = stylus pressure increases.

Tone Arm Height Adjustment-

The tone arm height is adjusted by the tone arm height adjustment screw shown in Figure 3. The tone arm should be adjusted to land low enough for the stylus to follow the grooves of a thin record. To adjust, loosen the hex. locking nut and run the adjustment screw in or out until the correct adjustment is obtained. After adjustment is made, tighten the hex. locking nut.

Idler Wheel Height Adjustment-

Place speed control knob (18) in one of the "0" positions and lift off the turntable. Check to see that idler wheel (17) lies horizontal and that its height is correct. The bottom edge of the idler wheel tire must not be sliding on the next step of the motor pulley. The height can be adjusted by loosening hex. nut (29) and turning speed change worm (26). After adjustment is made tighten hex. nut (29), and, if necessary, set knob (18) so that its numerals face the white dot on the baseplate.

Automatic Shut-Off Adjustment-

If the Miraphon fails to shut off or if it shuts off before the stylus enters the lead-out groove of a record, adjustment may be made by repositioning the tray (40) as follows:

With the tone arm clamped to its rest post, the set screw in tray (40) should be positioned to face directly toward the front of the baseplate.

IMPORTANT: When repositioning the tray (40) it is very important that a small gap be left between the weight (37) and the baseplate, to allow the tone arm to move freely across a record.

LUBRICATION

The motor bearings have been filled with oil (Shell Vitrea 27) sufficiently to last for years of operation. The turntable is lubricated with a very light grease (Esso Millcot K-40).

No grease or oil should be applied to the inside of the turntable rim, the step pulley of the motor, or the rubber tire of the idler wheel. If oil or grease should accidently come into contact with these parts, clean with alcohol or acetone.

TROUBLES AND PROBABLE REMEDIES

Stylus Does Not Track Properly-

1. Check stylus with a magnifying glass to see if it is worn or chipped. If worn or chipped, replace.

2. Check record to see if grooves are worn or broken. Play several different records before condemning record player.

3. Check the stylus and make sure it is free of dust and dirt. Clean stylus with a soft brush.

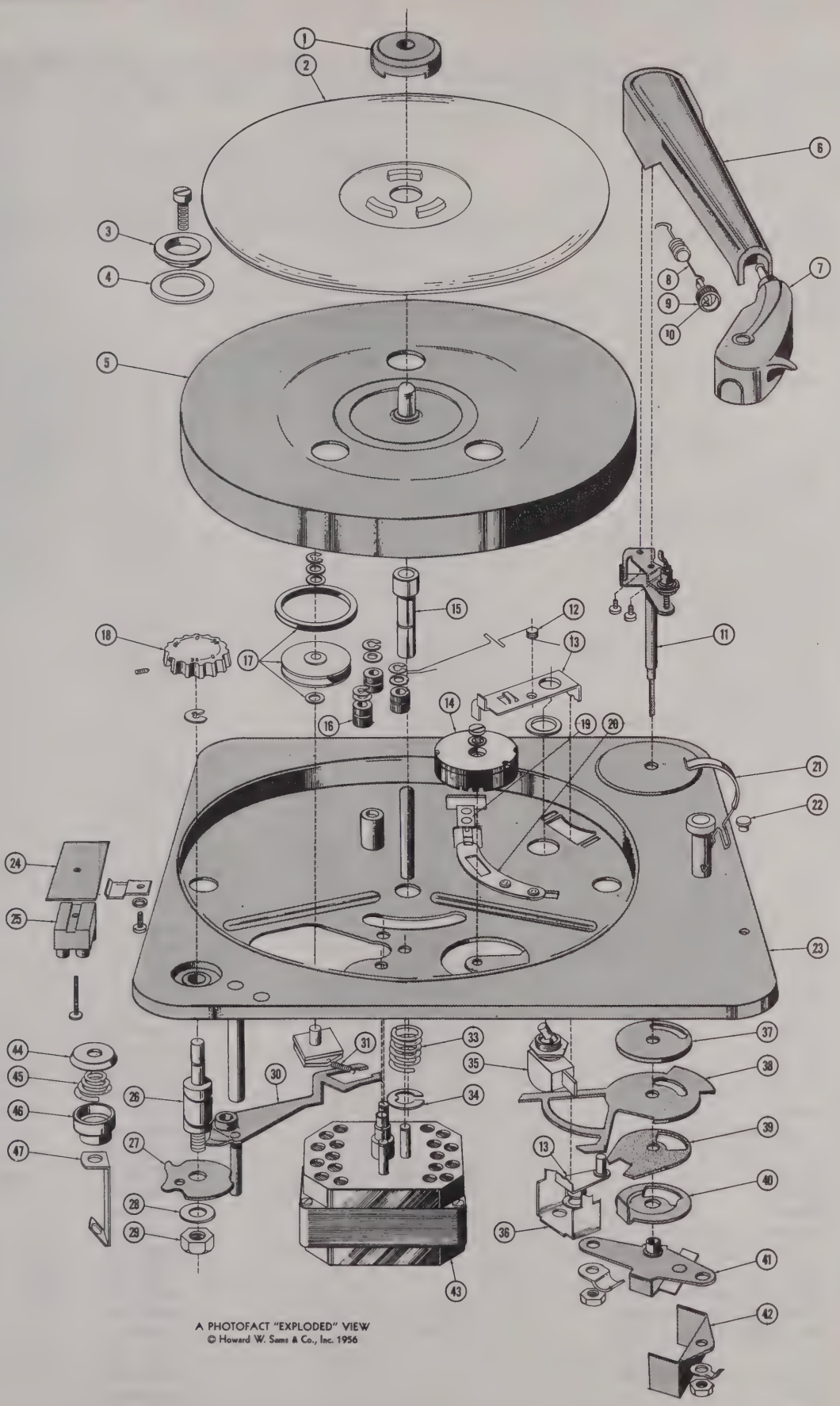
4. Check weight (37) to see if there is a small gap between it and the baseplate. If not, adjust as described under "Automatic Shut-Off Adjustment".

5. Check the stylus pressure, if it is less than the recommended six grams the tone arm will not track properly. If necessary, adjust as described under "Stylus Pressure Adjustment".

6. Check the tone arm height to see if the stylus sets low enough to ride in the record grooves. Adjust as described under "Tone Arm Height Adjustment".

Rumble-

"The MIRAPHON should be completely free of Rumble. If at any time rumble or "thumping" is heard while the turntable is in motion, the idler wheel (17) should be checked. If speed selector knob (18) has not



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been set to "Zero" while the player has been out of service for a period of time, the rubber tire on the idler wheel may show a dent or depression."

"First, try running the player for several minutes at 78 rpm. If the dent does not disappear replace the rubber tire. Always make sure that when the tire is replaced that it fits perfectly into position without any bumps."

Turntable Does Not Run At Proper Speed-

1. Check height of idler wheel as described under "Idler Wheel Height Adjustment".

2. Place speed control knob (18) in one of the "0" positions and rotate the turntable by hand to see if it turns easily and coasts for a period of time. If necessary, clean the turntable bearing with a clean soft cloth and lubricate as described under "Lubrication".

3. Check the idler wheel tire and turntable rim for oil or grease. If necessary, clean the motor pulley, idler wheel tire, and turntable rim with alcohol or acetone.

Automatic Shut Off Does Not Function Properly-

1. Check shut off adjustment as described under "Automatic Shut Off Adjustment".

SPARE PARTS LIST FOR XM 110 AND XM 110A

Ref. No.	Description	XM 110 Part No.		XM 110A Part No.	
1	Adaptor	10-056 ++		10-056 ++	
2	Rubber Mat	10-044-10		10-027-100 ++	
3	Cup, Transport Lock			10-031-61	
4	Washer, Transport Lock			10-031-63	
5	Turntable	10-030 U2		10-031 U7	
6	Pick-up Arm	10-102 B		10-102 B	
7	Plug-in Head TAK 1A	10-101A ++		10-101A ++	
8	Tension Spring	10-038-26 ++		10-038-26 ++	
9	Needle Pressure Adj. Nut	10-038-29 ++		10-038-29 ++	
10	Headless Screw	10-038-28 ++		10-038-28 ++	
11	Axle, Riveted	10-044 U2		10-042 U2	
12	Tracer Spring	10-016-21		10-031-17	
13	Switch Lever, Riveted	10-016 U4		10-031 U6	
14	Voltage Selector	90-182A ++		90-182A ++	
15	Bushing			10-031 U2	
16	Rubber Grommet, Motor Mtg.	10-038-51 ++		10-038-51 ++	
17	Idler Wheel, Complete	10-016 U8 ++		10-016 U8 ++	
18	Control Knob	10-027-21 ++		10-027-21 ++	
19	Contact Spring			10-031-22	
20	Cam			10-031 U10	
21	Tone Arm Bracket	10-044 U8		10-042 U6	
22	Plastic Plug			10-031-51 ++	
23	Chassis, Complete	10-044 U1		10-042 U8	
24	Insulating Plate	10-027-183 ++		10-027-183 ++	
25	Bakelite Connector	ERK 777 ++		ERK 777 ++	
26	Worm	10-016-33		10-027-341 ++	
27	Speed Change Cam	10-044-15		10-027-22 ++	
28	Washer	8, 4DIN125 ++		8, 4DIN125 ++	
29	Hex. Nut	BM8DIN439 ++		BM8DIN439 ++	
30	Idler Pivot Lever, Riveted	10-044 U4		10-038 U3 ++	
31	Tension Spring	10-016-36 ++		10-016-36 ++	
32	Support	10-054-5		10-054-2 ++	
33	Compression Spring			10-031-41	
34	"C" Washer			9-DIN6799	
35	Switch	10-016-65		10-016-25	
36	Bracket	10-016-23		10-031-13	
37	Weight	10-016-15		10-031-14	
38	Segment	10-016 U12		10-031-10	
39	Felt Washer			10-031-11	
40	Tray, Riveted			10-031 U18	
41	Plate, Complete			10-031 U14	
42	Shielding Cup, Complete	10-031 U5 +		10-031 U5	
43	Motor MOW 8	10-036B		10-036A ++	
44	Tray			10-031-43 ++	
45	Truncated Cone Spring			10-031-50	
46	Cup			10-031-42 ++	
47	Clamp	10-026-2 ++		10-026-2 ++	

SPARE PARTS LIST FOR XM 110 AND XM 110A

Ref. No.	Description	Belongs to	XM 110 Part No.		XM 110A Part No.	
101	Felt Hose	5	10-027-258 ++		10-027-258 ++	
102	Bracket	10	10-038-85 ++		10-038-85 ++	
103	Bridge, Complete	11	10-038 U8 ++		10-038 U8 ++	
104	Ball	103	1mm ØKl. 3 ++		1mm Ø Kl. 3 ++	
105	Bracket	103	10-038-78 ++		10-038-78 ++	
106	Pivot	11	10-038-17 ++			
107	Spring Washer	11	10-038-24 ++			
108	Washer	11	10-038-71 ++			
109	Washer	11	10-038-56 ++			
110	Setting Ring	11	10-038-55 ++			
111	Shoulder Screw	11	10-038-54 ++			
112	Eccentric	11	10-038-23 ++			
113	Pressure Plate	41			10-031-56	
114	Shielding Cup, Complete	41	10-031-U5 +		10-031-U5	
115	Motor Pulley, 60 Cycles	43	10-036-39		10-036-30 ++	
116	Motor Pulley, 50 Cycles	43	10-036-38		10-036-29 ++	
117	Rubber Ring	17	10-012-48 ++		10-012-48 ++	
118	Spacing Washer	17	1-02301-197 ++		1-02301-197 ++	
119	Pick-up Lead		10-038 U54 ++		10-038 U54 ++	
120	Power Cord		LiV3-1007 ++		LiV3-1007 ++	
121	Contact Spring				10-031-22	
122	Cam				10-031 U10	
123	Paper Condenser				0,1pF, 500V-++	
124	Resistor				30Ω, 1 W	
125	Rubber Gasket		Hellerman #10		Hellerman #10	
126	Clip for Adaptor		10-027-224 ++		10-027-224 ++	

METRIC HARDWARE FOR XM 110 AND XM 110A

Ref. No.	Description	XM 110 Part No.		XM 110A Part No.	
201	Self-Tapping Cylindrical Screw	BM3X6DIN7513 ++		BM3X6DIN7513 ++	
202	Self-Tapping Cylindrical Screw			BM3X15DIN7513 ++	
203	Cylindrical Screw	AM3X8DIN84			
204	Cylindrical Screw			AM3X5DIN84	
205	Cylindrical Screw	AM2, 6X5DIN84 ++		AM2, 6X5DIN84 ++	
206	Cylindrical Screw	AM2, 6X6DIN84 ++		AM2, 6X6DIN84 ++	
207	Cylindrical Screw	AM3X15DIN84 ++			
208	Cylindrical Screw			AM4X6DIN84	
209	Headless Screw	M2, 6X3DIN551 ++			
210	Headless Screw	M3X6DIN553 ++		M3X6DIN553 ++	
211	Headless Screw			M3X8DIN551 ++	
212	Roundheaded Wood Screw	2X10DIN96 ++		2X10DIN96 ++	
213	Hexagonhead Nut	M3DIN934 ++		M3DIN934 ++	
214	Hexagonhead Nut			BM3DIN439 ++	
215	Hexagonhead Nut	BM4DIN439 ++		BM4DIN439 ++	
216	Hexagonhead Nut	BM8DIN439 ++		BM8DIN439 ++	
217	Squarehead Nut	M3DIN562 ++		M3DIN562 ++	
218	Washer	3, 2DIN433 ++		3, 2DIN433++	
219	Washer	3, 2DIN125 ++		3, 2DIN125 ++	
220	Washer	4, 3DIN433 ++		4, 3DIN433 ++	
221	Washer	8, 4DIN125 ++		8, 4DIN125 ++	
222	Washer (for idler wheel)	8/4, 3X0, 5 ++ WN2311 Hp		8/4, 3X0, 5 ++ WN2311 Hp	
223	"C" Washer	3, 2DIN6799 ++		3, 2DIN6799 ++	
224	"C" Washer	5DIN6799 ++		5DIN6799 ++	
225	"C" Washer			9DIN6799	
226	Soldering Lug	4X12Bl DIN41496		4X12Bl DIN4196	
227	Clamp	1X4 Kr2571 ++		1X4 Kr2571 ++	
228	Clamp	10-042-12 ++		10-042-12 ++	
229	Insulating Plate	10-053-3 ++		10-035-3 ++	

+ Parts indicated with "+" are fully exchangeable with parts originally used in the XM 110.
++ All parts marked with "++" are also used for the record changer Miracord XA 100.

PHOTOFACT* Folder

*TRADE MARK

PHILCO MODELS 22D4033G, L, 22D4135, 22D4137, L, 22D4139, L, 22D4321L, M, T, W (Ch. TV-332, U)

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PHILCO MODEL 22D4033L

TRADE NAME	Philco	MODELS	CHASSIS
		22D4033G, 22D4033L, 22D4135, 22D4137, 22D4137L, 22D4139, 22D4139L, 22D4321L, 22D4321M, 22D4321T, 22D4321W	TV-332, U
MANUFACTURER	Philco Corporation, Tioga & "C" Streets, Philadelphia, Pa.		
TYPE SET	Television Receiver		
TUBES	Seventeen		
POWER SUPPLY	110-120 Volts AC - 60 Cycles	RATING 1.5 Amp. @ 117 Volts AC	
TUNING RANGE-Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)			

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PHILCO MODELS 22D4033G, L, 22D4135, 22D4137, L, 22D4139, L, 22D4321L, M, T, W (Ch. TV-332, U)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 3 push-on type control knobs from front panel of cabinet.
2. Remove 2 phillips head screws from knob cover and then remove 4 small push-on type control knobs.
3. Remove 10 metal screws. Remove rear cover.
4. Remove on/off and channel selector switches (from inside top of cabinet) by slipping them out of the brackets.
5. Disconnect speaker leads, H. V. lead, picture tube socket and yoke plug.
6. Remove 1 metal screw. Remove remote control plug.
7. Remove 4 chassis bolts. Remove chassis.
8. Remove 2 speaker nuts. Remove speaker.

MODEL	CHASSIS
22D4033L	TV-332

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 3 metal screws holding metal molding at top of the safety glass. Remove molding and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Adjustmant is located on top of the chassis. Set the horizontal hold control to the center of its range and adjust B1 until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L27) located on top of the chassis.

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

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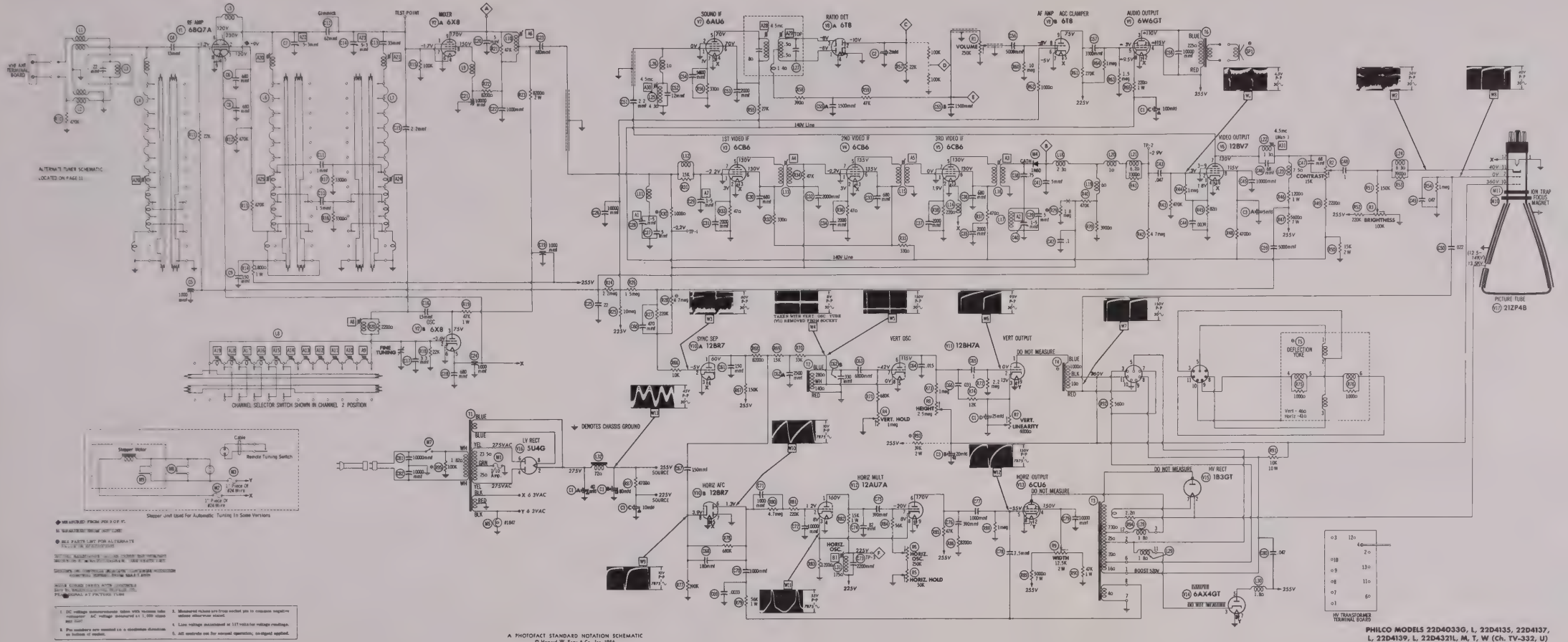
ALTERNATE TUNER SCHEMATIC
LOCATED ON PAGE 11
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 2 POSITION
Stepper Unit Used For Automatic Tuning In Some Versions
DENOTES CHASSIS GROUND
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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PHILCO MODELS 22D4033G, L, 22D4135, 22D4137, L, 22D4139, L, 22D4321L, M, T, W (Ch. TV-332, U)

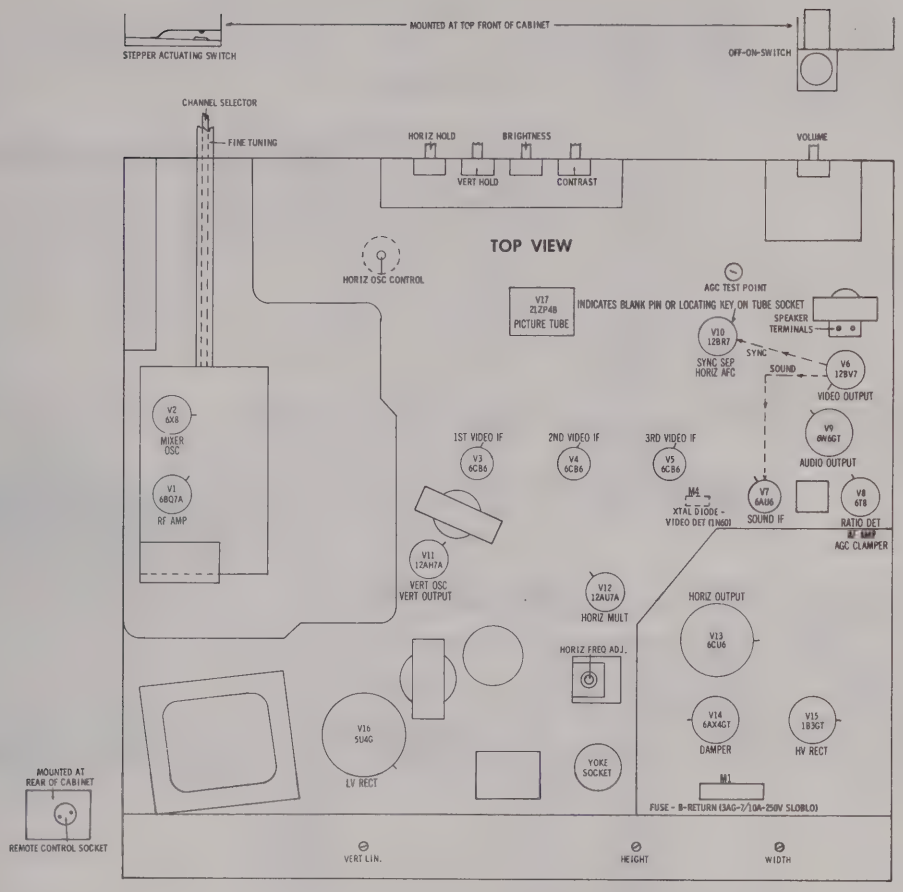
CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

PHILCO MODELS 22D4033G, L, 22D4135, 22D4137, L, 22D4139, L, 22D4321L, M, T, W (Ch. TV-332, U)

PHILCO MODELS 22D4033G, L, 22D4135, 22D4137, L, 22D4139, L, 22D4321L, M, T, W (Ch. TV-332, U)

CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V16, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V9
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V17
Has pic, no sound - V7, V8, V9
Overloaded picture - V8

SYNC FAILURE
No vert. sync - V10, V11
No horiz. sync - V10, V12
No vert. or horiz. sync - V10

SWEEP FAILURE
No raster, has sound - V12, V13, V14, V15, V17
No vertical deflection - V11
Poor vert. linearity or foldover - V11
Poor horiz. linearity or foldover - V12, V13, V14
Narrow picture - V12, V13, V14, V15, V16
Vert. off freq. - V10, V11
Horiz. off freq. - V10, V12

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Allow 15 minutes for receiver and test equipment to warm up. There must be a good bond between chassis and test equipment.
Connect the deflection yoke and speaker during alignment.
Do not remove the horizontal oscillator tube (V12) to disable the high voltage. The high voltage lead should be securely taped and kept away from the chassis. The IF shield must be in place.

VIDEO IF ALIGNMENT

Set contrast control fully clockwise. Connect negative lead of 5 volt bias supply to TP1. Positive to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Tube Shield	High side to floating tube shield over dummy 6X8 osc. tube with pin 3 removed.	Not used.	47.25MC (400∿ 30% Mod.)	2	Vert. amp. to pin 11 of picture tube.	A1, A2	Adjust for MINIMUM indication on scope.
2.	"	"	"	44.4MC (400∿ 30% Mod.)	"	"	A3	Adjust for maximum indication on scope.
3.	"	"	"	43.1MC (400∿ 30% Mod.)	"	"	A4	"
4.	"	"	"	45.0MC (400∿ 30% Mod.)	"	"	A5	"
5.	"	"	"	45.5MC (400∿ 30% Mod.)	"	"	A6	"
6.	Fig. 1	Across antenna terminals thru matching network. (Fig. 1)	"	42.7MC (400∿ 30% Mod.)	"	"	A7	"
7.	"	"	69MC (6MC Swp)	42.5MC 45.75MC	4	"		Check response curve for curve limits and marker position as in Fig. 2. If necessary, readjust A5 and A6 for proper curve level, and A2 and A4 for proper marker positions. CAUTION! Retouch only SLIGHTLY. Replace 6X8 back in socket.

OSCILLATOR ALIGNMENT

Disconnect white wire (AGC line) from main chassis going to tuner. Connect negative lead of 1.5 volt bias supply to loose end. Positive lead to chassis.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	Not used.	257MC	13	Vert. amp. thru 1000Ω to point (A). Low side to chassis.	A8	Adjust for zero beat on scope. If regeneration occurs, increase bias. Bias may be increased up to 4 ot 5 volts if necessary.
				251MC	12		A9	
				245MC	11		A10	
				239MC	10		A11	
				233MC	9		A12	
				227MC	8		A13	
				221MC	7		A14	
				129MC	6		A15	
				123MC	5		A16	
				113MC	4		A17	
				107MC	3		A18	
				101MC	2		A19	

RF AND MIXER ALIGNMENT

Connect bias as in "Oscillator Alignment". Disconnect tuner coupling link leads and connect a 40 to 70 ohm carbon resistor across the open lead from the tuner. Remove V3 from its socket. Adjust scope control to obtain a width sweep twice the height.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Fig. 1	Across antenna input thru matching network.	213MC (10MC Swp)	213MC	13	Vert. amp. thru 1000Ω to point (A). Low side to chassis.	A20, A21	Adjust for response similar to Fig. 3. Adjust A20 first to set carrier level, then adjust A21 for proper tilt.
10.	"	"	177MC (10MC Swp)	177MC	7	"	A22, A23	Check for response indicated by dotted lines in Fig. 4A and 4B. If necessary, adjust for mirror image of original response curve. (Tilt in opposite direction.) If response appears as in Fig. 4A, adjust A22 and A23 until curve appears as in Fig. 4B. This adjustment over compensates to allow for channel 13 adjustment. Repeat steps 9 and 10 until centered and symmetrical response curves are obtained on channels 7 and 13.
11.	"	"	85MC (10MC Swp)	85MC	6	"	A24, A25, A26	Adjust for symmetrical response approximately at center of bandpass. Adjust A24 counter clockwise until single peak appears. Adjust A25 until peak falls on 85MC marker. Adjust A26 for maximum curve amplitude and symmetry of single peak. Retouch SLIGHTLY, if necessary, A24 and A25 for symmetrical response centered at approximately the 85MC marker point similar to Fig. 3.

UHF IF ALIGNMENT

Same as "RF and Mixer Alignment".

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Direct	UHF input jack.	43.5MC (10MC Swp)	43.5MC	UHF	Vert. amp. thru 1000Ω to point (A). Low side to chassis.	A27	Adjust for flat response.

ALIGNMENT INSTRUCTIONS (cont)

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove 6CB6 (V3, 1st video IF tube) from its socket.
Connect two matched 100KΩ (±1%) resistors in series from point Ⓒ to chassis. The junction of these two resistors is alignment point Ⓓ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
13.	2200Ω carbon resistor	High side thru 2200Ω resistor to point Ⓑ. Low side to chassis.	4.5MC (400∿ 30% Mod.)	Any non-interfering channel.	DC probe to point Ⓒ. Common to chassis.	A28, A30	Adjust for maximum indication.
14.	"	"	"	"	DC probe to point Ⓔ. Common to point Ⓓ.	A29	Adjust for MINIMUM indication on scope. A zero reading will be obtained on either side of the correct setting. Replace V3 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove 6CB6 (V3, 1st video IF tube) from its socket.
Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	2200Ω carbon resistor	High side to point Ⓑ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point Ⓒ. Low side to chassis.	A28, A29	Disconnect stabilizing capacitor C2. Increase generator output for reading on scope. Adjust for curve of maximum amplitude and symmetry similar to Fig. 5.
14.	"	"	"	"	"	Vert. amp. to point Ⓔ. Low side to chassis.	A30	Reconnect C2. Increase generator output for reading on scope. Adjust A30 so that 4.5MC marker occurs at crossover lines as in Fig. 6. SLIGHTLY readjust A29 for maximum amplitude and straightness of crossover lines. Replace V3 in its socket.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
15.	2200Ω carbon resistor	High side thru 2200Ω resistor to point Ⓑ. Low side to chassis.	4.5MC (400∿ 30% Mod.)	Any non-interfering channel.	Positive lead thru crystal probe to pin 11 of picture tube.	A31	Adjust for MINIMUM indication.

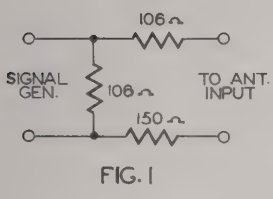


FIG. 1

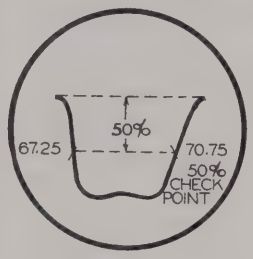


FIG. 2

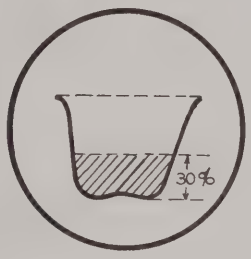


FIG. 3

FIG. 4A

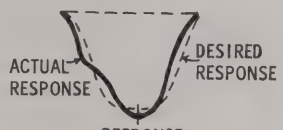


FIG. 4B

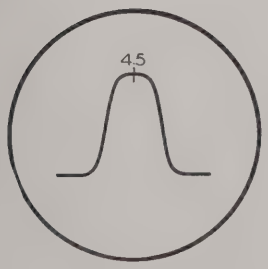


FIG. 5

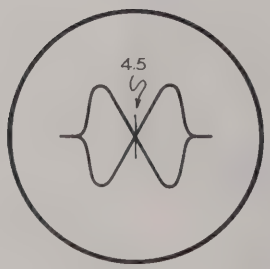
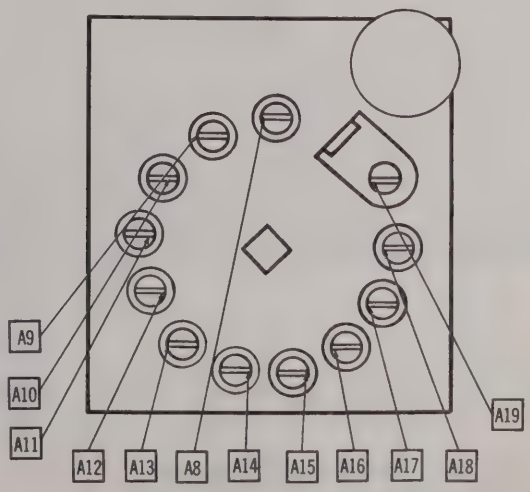


FIG. 6

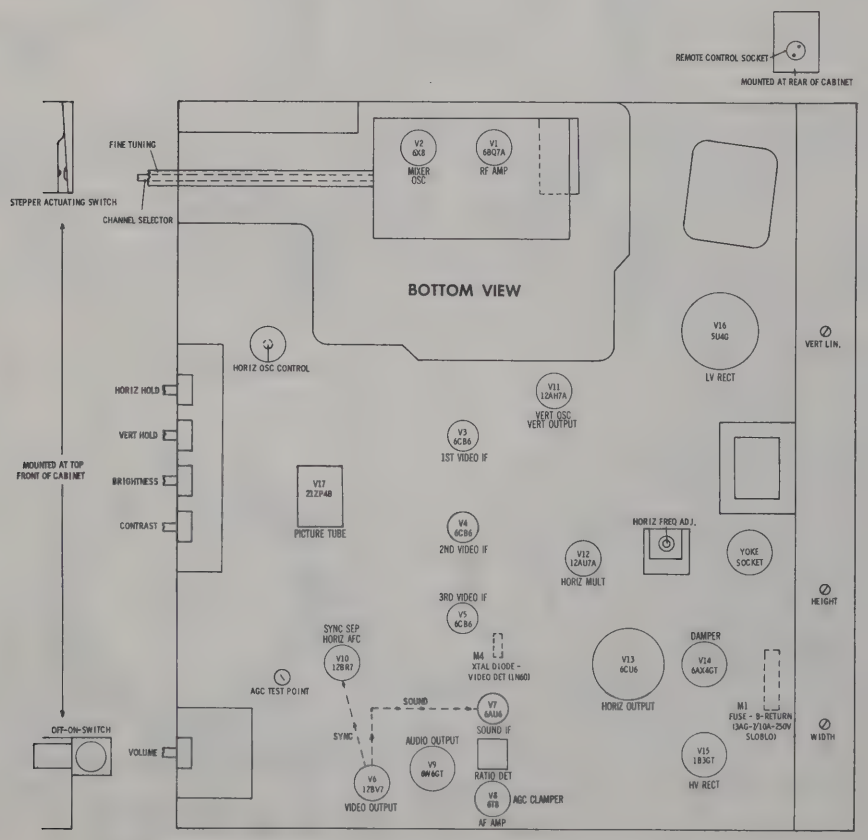


OSCILLATOR ADJUSTMENTS

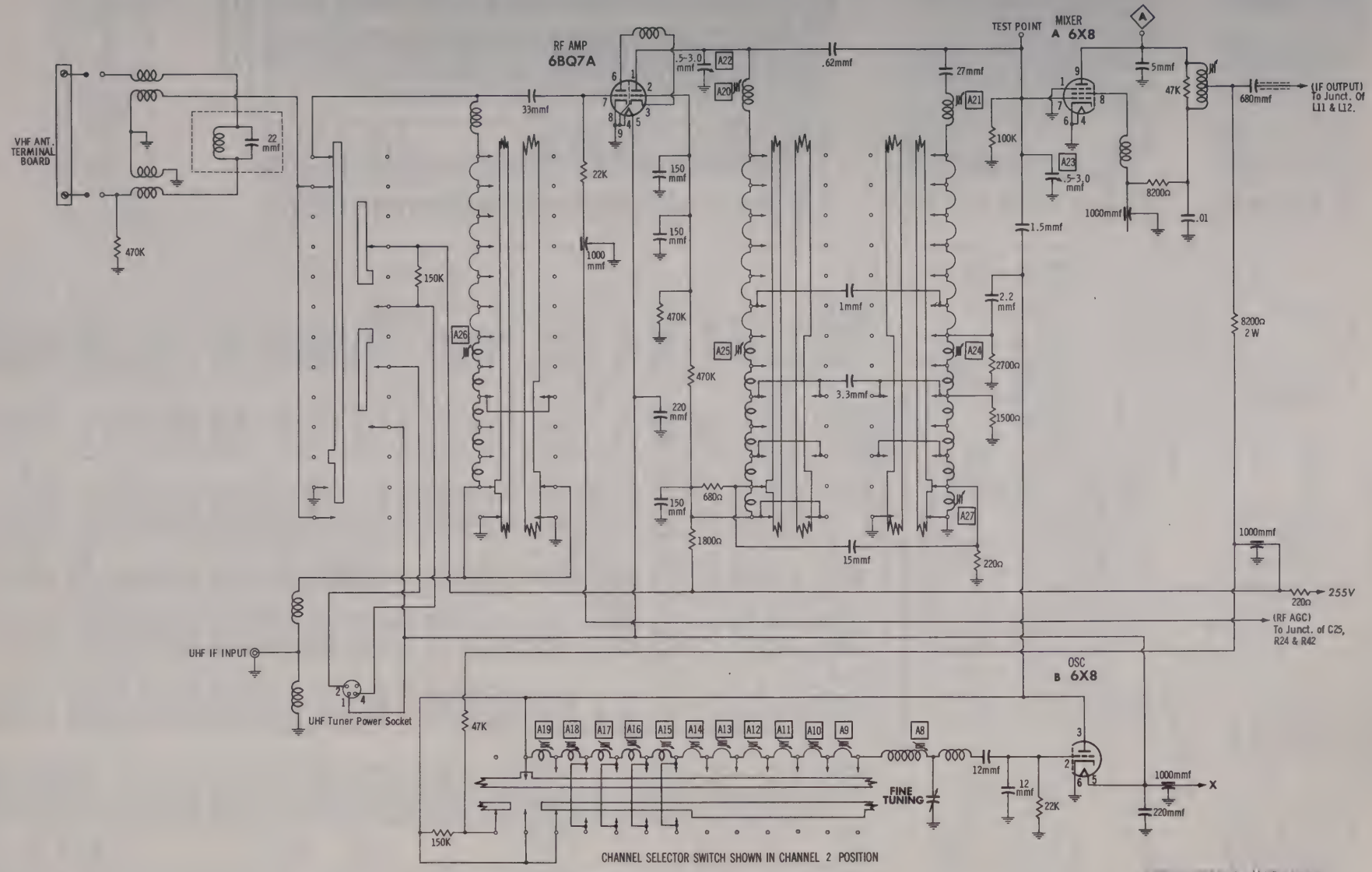
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BQ7A	†1800Ω	250K	INF	0Ω	.1Ω	INF	2.2Meg	0Ω	0Ω
V2	6X8	0Ω	22K	†47K	0Ω	.1Ω	0Ω	100K	†17K	†8200Ω
V3	6CB6	350K	47Ω	.1Ω	0Ω	■660Ω	■660Ω	0Ω		
V4	6CB6	350K	47Ω	.1Ω	0Ω	■330Ω	■330Ω	0Ω		
V5	6CB6	.1Ω	220Ω	.1Ω	0Ω	■470Ω	■470Ω	0Ω		
V6	12BV7	82Ω	350K	0Ω	0Ω	0Ω	.1Ω	†6000Ω	▪4700Ω	0Ω
V7	6AU6	5.3Ω	0Ω	0Ω	.1Ω	■27K	■27K	330Ω		
V8	6T8	300K	22K	300K	0Ω	.1Ω	2Meg	0Ω	10Meg	†270K
V9	6W6GT	TP	.1Ω	†300Ω	†72Ω	600K	TP	0Ω	10K	
V10	12BR7	†40K	3.5Meg	0Ω	.1Ω	.1Ω	1Meg	0Ω	390K	0Ω
V11	12BH7A	▪11K	2.2Meg	●800Ω	0Ω	0Ω	●▪2Meg	●1Meg	140Ω	.1Ω
V12	12AU7A	†20K	5Meg	1200Ω	0Ω	0Ω	†50K	●120K	1200Ω	.1Ω
V13	6CU6	TP	.1Ω	NC	●†7500Ω	1Meg	TP	0Ω	0Ω	TOP CAP ▪28Ω
V14	6AX4GT	NC	NC	120K	TP	†75Ω	NC	.1Ω	0Ω	
V15	1B3GT	PINS 1 - 8 HAVE INFINITE RESISTANCE								TOP CAP ▪758Ω
V16	5U4G	NC	20K	NC	25Ω	NC	24Ω	NC	20K	
V17	21ZP4B	0Ω	1Meg	Pin 10 ▪10K	Pin 11 ●†180K	Pin 12 .1Ω				

† MEASURED FROM PIN 2 OF V16.
■ MEASURED FROM 140V LINE.
▪ MEASURED FROM PIN 3 OF V14.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
TP TIE POINT
NC NO CONNECTION



TUBE PLACEMENT CHART



ALTERNATE TUNER SCHEMATIC

PHILCO MODELS 22D4033G, L, 22D4135, 22D4137, L, 22D4139, L, 22D4321L, M, T, W (Ch. TV-332, U)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amp.	6BQ7A	
V2	Mixer-Osc.	6X8	
V3	1st Video IF Amp.	6CB6	
V4	2nd Video IF Amp.	6CB6	
V5	3rd Video IF Amp.	6CB6	
V6	Video Output	12BY7	
V7	Sound IF Amp.	6AU6	
V8	Ratio Det.-AFA mp.- AGC Clamper	6T8	
V9	Audio Output	6W6GT	
V10	Sync Sep.-Horiz. AFC	12AT7	
V11	Vert. Osc. -Vert. Output	12BH7A	
V12	Horiz. Mult.	12AUTA	
V13	Horiz. Output	6CU6	
V14	Damper	6AX4GT	
V15	HV Rectifier	1B3GT	
V16	LV Rectifier	5U4G	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	PHILCO PART No	CBS PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No	
V17	21ZP4B ①	21ZP4B ①	21ZP4B ①	21ZP4B ② 21ZP4A 21ZP4	① Aluminized ② Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP	VOLT	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	400	30-3584-47	AFH4-417-44	C1336 QR356	FP420.45	TMQ-145	T-180 MT-3E500	TVL-4584
B	▲80	350							
C	▲100	300							
D	35	50							
C2	2	50	48-3036-4	PR50V2	BBR2-50	TC302	TD3-50	MT-0502	TVA-1301
C3A	5	150	30-3584-50	AFH3-159-60	C1448	FP250 TC40	TMT-196	T-185 FPM-1504	TVL-3508.6
B	▲30	475							
C	▲10	250							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	33		63-03340921	MP0-4133	D6-330	TS18	MP01-330	ST-5433	ST-CC-333	
C5	1000		30-1345-8							
C6	680		63-18800311	SI680	D6-681	TP50	GP2K-681	UC-5368	SCA-T68	
C7	5.3		31-5330-3		SB0-3		31S-01-03S	CT5S5A		
C8	680		63-18800181	SI680	D6-681	TP50	GP2K-681	UC-5368	SCA-T68	
C9	180		30-1338-9		BPD-0001S	DD-181	C0648	61I-181	UC-531	
C10	1.8		30-1321-8	MP0-4DL.8	TCZ-1R8	TZ04	MP0A-1R8	ZT-5518	STCC-V18	
C11	1		30-1321-31	MP0-421	TCZ-1	TZ03	MP0A-010		STCCB-V1	
C12	.68		30-1353-1							
C13	33		63-03340921	MP0-4133	D6-330	TS18	MP01-330	ZT-5433	STCC-333	
C14	5.3		31-5330-3		SB0-3		31S-01-03S	CT5S5A		
C15	2.2		30-1321-6							
C16	18		30-1324-113		TCL-15					
C17	33		30-1324-118		TCH-330		MY90A-3R3	ST-5533	STCCB-V3	
C18	680		63-18800181	SI680	D6-681	TP50	GP2K-681	UC-5368	SCA-T68	
C19	1000		30-1345-6							
C20	10		30-1324-39	MP0-4I5	TCZ-4R7	2011	MP0A-050	ST-565	STCCB-V47	
C21	10000		30-1338-5	BPD-01	DD-103	E0S3	81I-01	DC511	5HK-61	
C22	1000		30-1345-6							
C23	680		63-18800181	SI680	D6-681	TP50	GP2K-681	UC-5368	SCA-T68	
C24	1000		30-1345-6							
C25	10000	300	30-4650-49	PT50H-33		CUB4P2S		PT4033	5TM-P33	
C26	10000		30-1338-5	BPD-01	DD-103	E0S3	81I-01	DC511	5HK-61	
C27	680		63-18800181	SI680	D6-681	TP50	GP2K-681	UC-5368	SCA-T68	
C28	10		30-1324-39	MP0-4I5	TCZ-4R7	2011	MP0A-050	ST-565	STCCB-V47	
C29	1-5		31-5320-9		SZ0-5					
C30	680		63-18800181	SI680	D6-681	TP50	GP2K-681	UC-5368	SCA-T68	
C31	3000		30-1338-12	BPD-002	DD-302	E072	801-003	DC523	5HK-D3	
C32	3000		30-1338-13	BPD-002	DD-303	E075	801-003	DC523	5HK-D3	
C33	680		63-18800181	SI680	D6-681	TP50	GP2K-681	UC-5368	SCA-T68	
C34	3000		30-1338-13	BPD-002	DD-303	E075	801-003	DC523	5HK-D3	
C35	3000		30-1338-12	BPD-002	DD-302	E072	801-003	DC523	5HK-D3	
C36	680		63-18800181	SI680	D6-681	TP50	GP2K-681	UC-5368	SCA-T68	
C37	3000		30-1338-13	BPD-002	DD-303	E075	801-003	DC523	5HK-D3	
▨▨	.75		30-1324-108							
C39	5		30-1324-38	MP0-4I5	DD-050	2011	81I-050	ST-565	STCCB-V47	
▨▨	1-5		31-5320-9		SZ0-5					
C41	5		30-1324-38		DD-050	2011	81I-050	ST-565	STCCB-V47	
C42	.1	200	30-4650-47	PT8BH-1	DF-104	CUB2P1		PT401	2TM-P1	
C43	.047	200	30-4650-45	PT8BH-05	DF-503	CUB4S47		PT4147	5TM-S47	
C44	.0039	350	30-4681-1			HED349			MH-339	
C45	10000		30-1338-3	BPD-01	DD-103	E0S3	81I-01	DC511	5HK-61	
C46	68		63-05804W01	MP0-4168	D6-680	TP33	GP2K-680	UC-5468	SCA-Q68	
C47	68		63-05804W01	MP0-4168	D6-680	TP33	GP2K-680	UC-5468	SCA-Q68	
C48	1	400	30-4650-47	PT4BH-1	DF-104	CUB4P1		PT401	4TM-P1	
C49	.047	400	30-4650-45	BPD-08	DF-503	CUB4S47		PT4147	4TM-S47	
C50	.033	400	30-4650-43	BPD-03	DF-303	CUB4S33	S17-03	PT4133	4TM-S33	
C51	5.5		30-1321-6	MP0-4I5.5	TCZ-5R3	TZ05	MP0A-5R3		STCCB-V55	
C52	13		63-03240901		TCZ-13	TZ10	MP0K-130			
C53	5000		30-1338-15	BPD-002	DD-502	E0T3	801-003	DC525	5HK-D2	
C54	5000		30-1338-1	BPD-005	DD-503	E080	81I-005	DC535	5HK-D5	
C55A	1800		30-1339-5	BPD-1300S	DDB-153	DB07	81I-0015	DCD1515	5HK-D15	
B	1500									
C56	5000		30-1338-1	BPD-005	DD-503	E080	81I-005	DCD525	5HK-D5	
C57	2500		30-1338-17	BPD-0025	DD-253	E0T7	81I-0025	UC-5333	5HK-D33	
C58	10000		30-1338-3	BPD-01	DD-103	E0S3	81I-01	DC511	5HK-61	
C59	5000		30-1338-1	BPD-005	DD-503	E080	81I-005	DC535	5HK-D5	
C60	470		63-14740201	SI470	D6-471	TP46	81I-471	UC-5347	SCA-T47	
C61	180		63-13900809	SI180	D6-181	TP28	81I-181	UC-5316	SCA-T18	
C62A	2500		30-1339-9	BPD-0025	D6-253	E0T4	GP2-533-253	UC-5335	SCA-D25	
B	330			BPD-00033	D6-331	TP43	GP2K-331	UC-5333	SCA-T33	
C63	6800	500	30-4650-97	BPD-068	D6-682	E0J1	81I-0068		5HK-D68	
C64	.015	400	30-4650-42	BPD-015	DD6-153	CUB4S15		PT4115	4TM-S15	
C65	.1	400	30-4650-47	PT4BH-1	DF-104	CUB4P1		PT401	4TM-P1	
C66	.033	400	30-4650-44							
C67	150		63-13500301	SI150	D6-151	TP26	GP2K-151	UC-5315	SCA-T15	
C68	180	500	30-1338417	BPD-018	DD-181	E2R07S6	81I-181		MH-318	
C69	.0033	400	30-4650-55	BPD-0033	DD-332	CUB4D33	GP2-533-333	UC-5333	5TM-D33	
C70	1000		30-1338-3	BPD-01	DD-103	E0S3	81I-01	DC511	5HK-61	
C71	1000		30-1338-3	BPD-01	DD-103	E0S3	80I-001	DC511	5HK-D1	
C72	10000		30-1338-5	BPD-01	DD-103	E0S3	81I-01	DC511	5HK-61	
C73	2300		80-30225434	1464-0032		1B5D23			MH-323	
C74	33	500	80-00835437	1469-00065	D6-330	2SB5G423	80I-330		MH-433	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C75	390		80-10395417			D6-391	81S739	811-391	MH-339	
C76	390		80-10395437			D6-391	81S739	811-391	MH-339	
C77	1000		30-1338-3		BPD-001	DD-102	E069	80I-001	5HK-D1	
C78	7.5		30-1324-122		MP0-S16.8	TCZ-6R8	Z014	MP0A-6R8	ZT-5568	STCCB-V68
C79	10000		30-1338-5		BPD-01	DD-103	E0S3	81I-01	DC511	5HK-61
C80	.047	400	30-4650-45		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47
C81	10000	600	30-4650-58		BPD-01	DD-103	E0S3	81I-01	DC511	5HK-61
C82	10000	600	30-4650-58		BPD-01	DD-103	E0S3	81I-01	DC511	5HK-61

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST ANCE	WATTS	PHILCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	250K	½	33-5565-99	B-51	A47-250K-Z	Q13-130	U44	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	15K	½	33-5572-15	A5T-154		Q13-153XX		Contrast
B	Shaft		Not Req.	AK-3		Not Req.		Attach to R2A
R3A	100K	½	33-5572-16	B-61	A47-100K-S	QU1-133	TA1SL	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
R4A	1Meg	½	33-5572-10	B-89	A47-1Meg-S	QU1-137	TA1EL	Vert. Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A
R5A	50K	½	33-5572-8	B-51	A47-50K-S	QU1-123	TA54L	Horiz. Hold
B	Shaft	½	Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R5A
R6A	250K	½	33-5572	AB-50	A47-250K-S	QU1-130	TA254L	Horiz. Osc.
B	Shaft		Not Req.	AK-1	FKS-1	Not Req.	Not Req.	Attach to R6A
R7A	2.5Meg	½	33-5572-17	AB-13	A47-2500-S	QU1-115	EU-50	Vert. Linearity
B	Shaft		Not Req.	AK-1	FKS-1	RQ	Not Req.	Attach to R7A
R8A	2.5Meg	½	33-5572-1	BX-83	A47-2.5Meg-S	QU1-239	TA2S5L	Height
B	Shaft		Not Req.	Not Req.	FKS-1	RQ	Not Req.	Attach to R8A
R9	12.5K	2	33-5574			WPK12500		Width (Wire-wound)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PHILCO PART No.	IRC PART No.	
R10	470K		66-4478340	BTS-470K	
R11	330K		66-4478340	BTS-330K	
R12	470K	5%	66-4478340	BTS-470K 5%	
R13	470K	5%	66-4478340	BTS-470K 5%	
R14	180Ω	1	66-3184340	BTA-180Ω	
R15	100K		66-4068340	BTS-100K	
R16	3300Ω		66-3338340	BTS-3300	
R17	3300Ω		66-3338340	BTS-3300	
R18	33K		66-3328340	BTS-33K	
R19	47K	1	66-3478340	BTA-47K	
R20	3300Ω		66-3338340	BTS-3300	
R21	47K		66-3478340	BTS-47K	
R22	330K		66-3348340	BTS-330K	
R23	8200Ω	2	66-3228340	BTS-8200	
R24	2.5Meg		66-5238340	BTS-2.5Meg	
R25	10Meg	5%	66-5038340	BTS-10Meg 5%	
R26	1.5Meg	5%	66-5158340	BTS-1.5Meg 5%	
R27	330K		66-4348340	BTS-330K	
R28	4.7Meg		66-5478340	BTS-4.7Meg	Note 1
R29	1.5Meg			BTS-1.5Meg	Note 2
R30	100Ω		66-3108340	BTS-100	
R31	15K		66-3158340	BTS-15K	
R32	330Ω		66-3338340	BTS-330	
R33	47Ω		66-3478340	BTS-47	
R34	47K		66-3478340		
R35	330Ω		66-3338340	BTS-330	
R36	47Ω		66-3478340	BTS-47	
R37	470Ω		66-3478340	BTS-470	
R38	330Ω		66-3338340	BTS-330	
R39	3300Ω		66-3338340	BTS-3300	
R40	470K		66-4478340	BTS-470K	
R41	330Ω		66-3338340	BTS-3300	
R42	4.7Meg		66-5478340	BTS-4.7Meg	
R43	470K		66-4478340	BTS-470K	
R44	1Meg		66-5018340	BTS-1Meg	
R45	82Ω		66-3828340	BTS-82	
R46	1300Ω	1	66-3138340	BTA-1300	
R47	5600Ω	?	33-3335-194		
R48	4700Ω		66-3478340	BTS-4700	
R49	2300Ω		66-3238340	BTS-2300	
R50	15Ω	2	66-3158340	BTS-15Ω	
R51	180K		66-4188340	BTS-180K	
R52	220K		66-4228340	BTS-220K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PHILCO PART No.	IRC PART No.	
R53	15000		66-2158340	BTS-15000	
R54	1Meg		66-5018340	BTS-1Meg	
R55	27Ω		66-3278340	BTS-27Ω	
R56	330Ω		66-3318340	BTS-330	
R57	22K		66-2238340	BTS-22K	
R58	390Ω		66-3918340	BTS-390	
R59	47K		66-3478340	BTS-47K	
R60	6800Ω		66-2688340	BTS-10Meg	
R61	270K		66-4278340	BTS-270K	
R62	1000Ω		66-3108340	BTS-1000	
R63	1.5Meg		66-5158340	BTS-1.5Meg	
R64	1Meg		66-5018340	BTS-1Meg	
R65	220Ω	1	66-3228340	BTA-220	
R66	10K		66-3108340	BTS-10K	
R67	150K		66-4158340	BTS-150K	
R68	22000		66-2238340	BTS-22000	
R69	15K		66-3158340	BTS-15K	
R70	33K		66-3338340	BTS-33K	
R71	680K		66-4688340	BTS-680K	
R72	2.5Meg		66-5258340	BTS-2.5Meg	
R73	1Meg		66-5018340	BTS-1Meg	
R74	12K		66-3128340	BTS-12K	
R75	1000				
R76	1000				
R77	330K		66-4338340	BTS-330K	
R78	680K		66-4688340		
R79	560Ω	1	66-3568340	BTA-560	
R80	47K	1	66-3478340		
R81	10K		33-1353-1	PW10-10K	
R82	180K		66-4188340		
R83	15K	1	66-3158340		
R84	120Ω		66-3128340		
R85	56K		66-3568340	BTS-56K	
R86	470K		66-4478340	BTS-470K	
R87	62000		66-2628340	BTS-62K	
R88	1Meg		66-5018340		
R89	5000Ω	?	33-3335-95	PW5-5000	
R90	47K	1	66-3478340		
R91	10K		33-1353-1	PW10-10K	
R92	560Ω		66-3568340		
R93	39K	2	66-3398340	BTS-39K	Note 3
R94	5.5Ω		66-3058290	SW1-5.5	
R95	100K		66-4108340	BTS-100K	Note 3

Note 1: Some versions use a 5.6Meg resistor in this application. (part #66-5668340)
Note 2: Not used in some versions.
Note 3: Some versions use a 2W resistor in this application. (part #66-4105340)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	PHILCO PART No.	Halloran PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC	525VCT	6V	12.6VCT	53-5730					
	① 1.5A	② .220A	③ 3A	④ 4A						
				7.5MA*						

* With tuner selector motor operating.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		PHILCO PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Rem PART No	Stancor PART No	Thordarson PART No	Triad PART No
T3	Vert. Osc. Trans.	53-8678	B8705 ①	A-3004 ①		V404(1) ①	A-8134 ①	26A02 ①	A-12C2 ①
	Horiz. Output Trans.	53-8700-1	FB644 & RF600F1 ③	EV6-21*1 ③	2327T1*3	X08B*1 ②	A-8130*1 ③	21T-2174 ③	D-70*1 ③
T4	Vert. Output Trans.	53-8656-1	A-3027	2227T1	V313	A-8133	26S52	A-10SX
		53-8658 ②	21804		V313	A-8133	26S52	A-10SX
T5A	Yoke-Horiz. (30MM)	53-9670 ④	DF604 ④ ⑤	MDF-71 ④				DY-13A ④	Y-34 ④ ⑤
B	Vert. (42MM)								Y-35 ⑤

① Connect red lead to yellow lead; then connect blue lead to ground, red and yellow leads to cathode (pin #8 of V11); green lead go grid capacitor (C63).
② Drill new mounting hole(s).
③ Fabricate new mounting bracket.
④ Alternate Philco part number.
⑤ Includes resistors R75 and R76.
⑥ Use original yoke damping network.
⑦ Connect horiz. yoke term #2 to yoke plug pin #5; Horiz. yoke terms #3 and #4 to yoke plug pin #6; Horiz. yoke term #5 to yoke plug pin #8.
‡ This part may be superceded by Parts Manufacturer's introduction of special unit for this application.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rem Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
12	4	5	10	5	5	5	5
2	Jumper 7 & 9	2	9	2	2	2	2
6	6	6	N.C. See note ②	6	6	6	6
1	1	1	3	1	1	1	1
8	Term #1 of RF600 Term #2 of RF600	8	2	8	8	8	8
	7	7	1	7	7	7	7
Connect With Red Lead ⟶	Terms #3 & #4 of RF600 Across 5 & 1						
Special Notes ⟶	③	③					

② If the picture is out of phase, reverse with coil primary or secondary.
③ To reduce yoke "ringing", add capacity (approx. 100MMF ② 3KV) in series with resistor R93 across horiz. yoke terms #1 & #2 (yoke deflection plus #3 & #5).

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC	PHILCO PART No.	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	
T6	2.4K	3-4Ω	53-8674	B1501	A-3036	A-3333	26S58	8-12A

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	PHILCO PART No.	QUAM PART No.	RCA TYPE No	
SP1	5 1/4"	PM	3-4Ω	36-1639-15 ①	52A1	217B1	① Used in model 22D4033L.
	5 1/4"	PM	3-4Ω	36-1639-8 ②	52A1	217B1	② Used in models 22D4033Q, 22D4033L, 22D4135, 22D4137, 22D4137L, 22D4139, 22D4139L, 22D4321, 22D4321L, M, T, W (Ch. TV-22D4137, L, 22D4139, L

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L31	175Ω		32-4557-4							

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	PHILCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L32	.210A	72Ω	1.4HY	32-8693	C5040	C-2994	C-2327	26C41	C-21X

FUSES

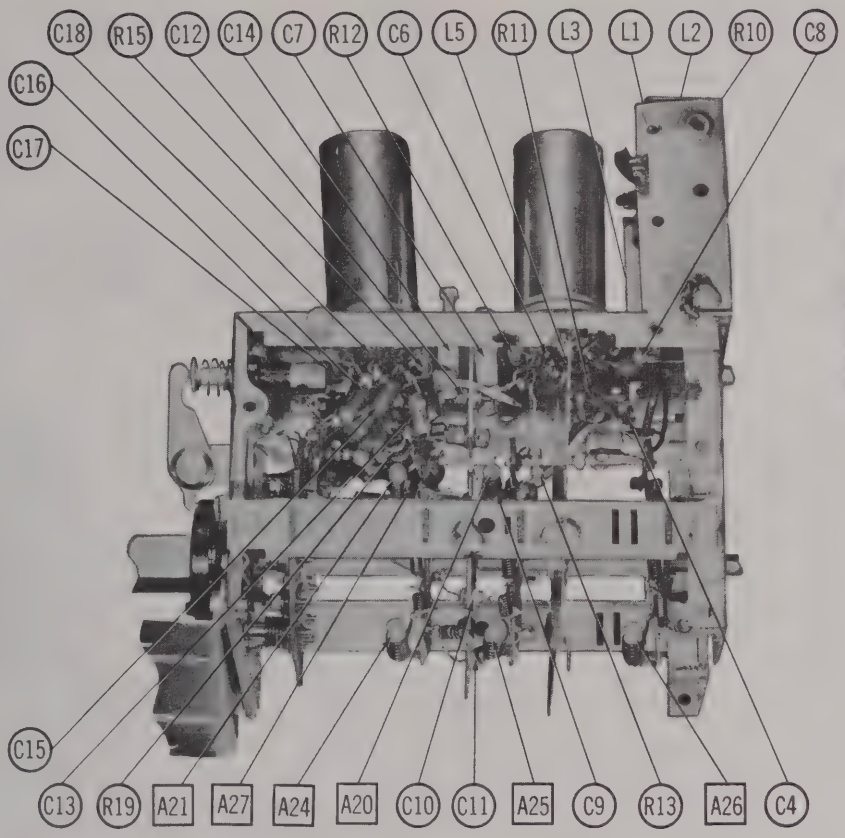
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			PHILCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	7/10A 250V	AD2246-15	76-4519-2	313.750 (3AG-S/B-3/4A)	357001	MDL 7/10	4405
M2	1" piece #24 wire							
M3	1" piece #24 wire							

CRYSTAL DIODES

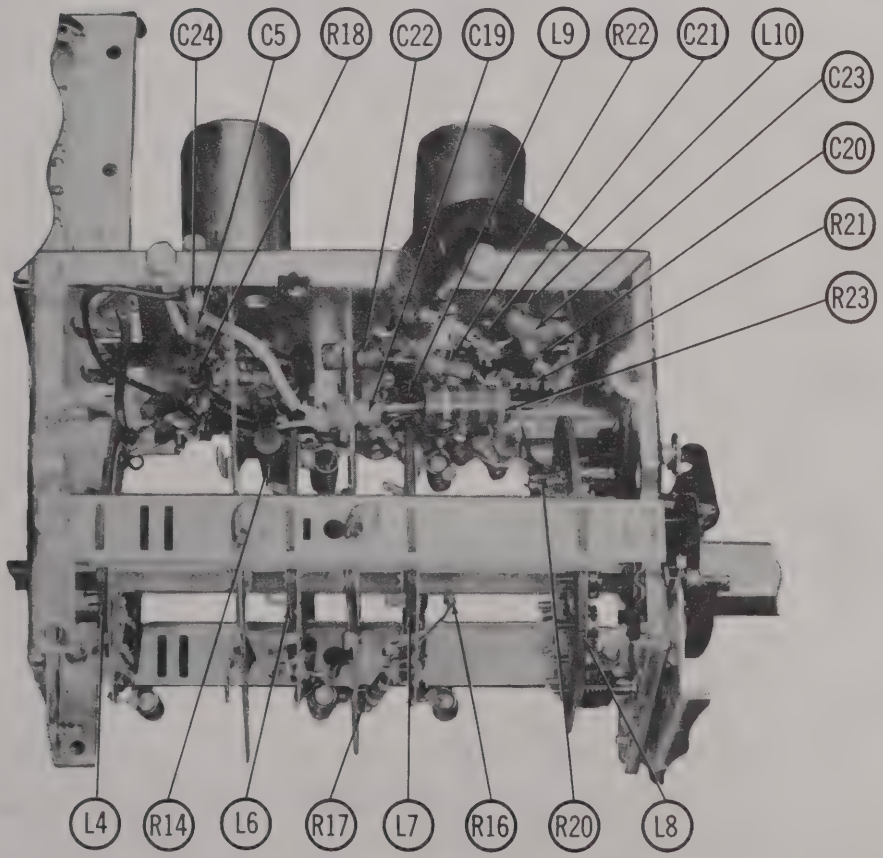
ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		PHILCO PART No.	SYLVANIA PART No.	
M4	1N60	34-8022-2	1N60	Video Det. (Pigtail)

MISCELLANEOUS

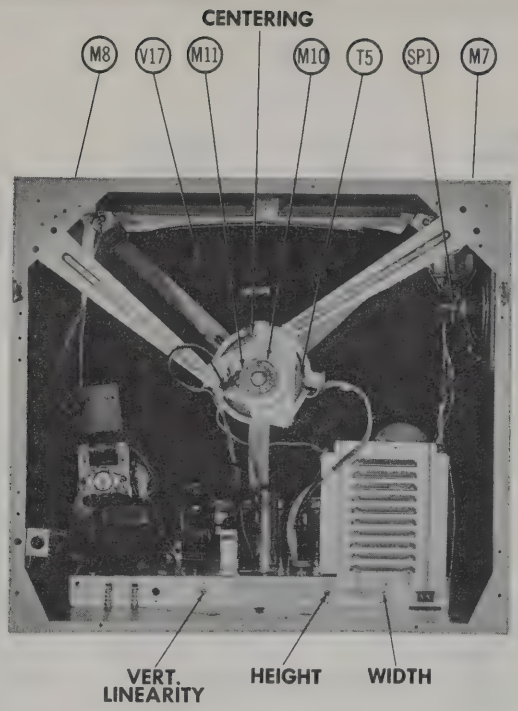
ITEM No.	PART NAME	PHILCO PART No.	NOTES
M5	Dial Light	34-2031-4	#1847
M6	Tuner	76-9192-4	VHF (T-38C) 12 Position - Chassis TV-332.
	Tuner	76-8946-12	VHF (T-36E) 13 Position - Chassis TV-332U.
M7	Switch	42-2053-1	On-Off (Power) SPST
M8	Switch	76-9739-3	Stepper Actuating (Micro Type)
M9	Switch	42-2051-1	Stepper Unit ("Hold" Switch)
M10	Focus Magnet	76-9511	Includes Centering Device
M11	Ion Trap	76-6077-2	
	Cabinet	11133-10	Model 22D4033G
	Cabinet	11133-26	Model 22D4033L
	Cabinet	11133-18	Model 22D4135
	Cabinet	11133-14	Model 22D4137
	Cabinet	11133-22	Model 22D4137L
	Cabinet	11168-2	Model 22D4139L
	Cabinet	11165-2	Model 22D4321L
	Cabinet	11141-14	Model 22D4321T
	Cabinet	11141-8	Model 22D4321M
	Cabinet	11141-10	Model 22D4321W
	Cabinet	11168	Model 22D4139
	Knob	54-6187-8	Brightness, Contrast, Horiz. Hold., Vert. Hold-Model 22D4033G
	Knob	54-6187-2	Brightness, Contrast, Horiz. Hold., Vert. Hold-Models 22D4033L, 22D4139L, 22D4321L, 22D4321W.
	Knob	54-6187	Brightness, Contrast, Horiz. Hold., Vert. Hold-Models 22D4135, 22D4139, 22D4321M.
	Knob	54-6187-4	Brightness, Contrast, Horiz. Hold, Vert. Hold-Models 22D4137, 22D4137L, 22D4321T.
	Knob	76-6104-9	Fine Tuning - All Models
	Knob	76-9237-16	Volume - Model 22D4033G
	Knob	76-9237-2	Volume - Models 22D4033L, 22D4139L, 22D4321L, 22D4321W.
	Knob	76-9237-1	Volume - Models 22D4135, 22D4139, 22D4321M.
	Knob	76-9237-17	Volume - Model 22D4137
	Knob	76-9237-14	Volume - Models 22D4137L, 22D4321T.
	Knob	76-9118-46	VHF Channel Selector - Model 22D4033G (Chassis TV-332)
	Knob	76-9118-42	VHF Channel Selector - Model 22D4033G (Chassis TV-332U)
	Knob	76-9118-32	VHF Channel Selector - Models 22D4033L, 22D4139L (Chassis TV-332)
	Knob	76-9118-8	VHF Channel Selector - Models 22D4033L, 22D4139L (Chassis TV-332U) & Models 22D4321L, 22D4321W (Chassis TV-332, TV-332U)
	Knob	76-9118-31	VHF Channel Selector - Models 22D4135, 22D4139 (Chassis TV-332)
	Knob	76-9118-7	VHF Channel Selector - Models 22D4135, 22D4139 (Chassis TV-332U) & Model 22D4321M (Chassis TV-332, TV-332U)
	Knob	76-9118-48	VHF Channel Selector - Model 22D4137 (Chassis TV-332)
	Knob	76-9118-47	VHF Channel Selector - Model 22D4137 (Chassis TV-332U)
	Knob	76-9118-38	VHF Channel Selector - Model 22D4137L (Chassis TV-332)
	Knob	76-9118-14	VHF Channel Selector - Model 22D4137L (Chassis TV-332U) & Model 22D4321T (Chassis TV-332, TV-332U)
	Pushbutton	54-9591	On-Off
	Pushbutton	54-9591-1	Stepper
	Mask	28-10075-23	Model 22D4033G
	Mask	28-10075-25	Models 22D4033L, 22D4135
	Mask	28-10075-28	Model 22D4137
	Mask	28-10075-29	Model 22D4137L
	Mask	28-9376-23	Models 22D4139, 22D4139L
	Mask	28-9376-21	Models 22D4321L, 22D4321M, 22D4321W
	Mask	28-9376-22	Model 22D4321T
	Safety Glass	54-9213-46	Models 22D4033G, 22D4033L, 22D4135, 22D4137, 22D4137L
	Safety Glass	54-9213-43	Models 22D4139, 22D4139L
	Safety Glass	54-9213-55	Models 22D4321L, 22D4321T, 22D4321M, 22D4321W.



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

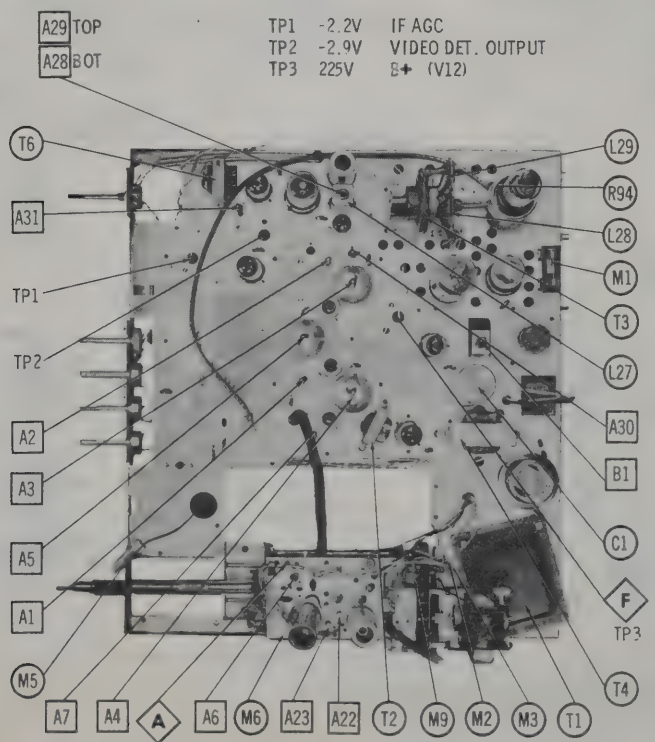


CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

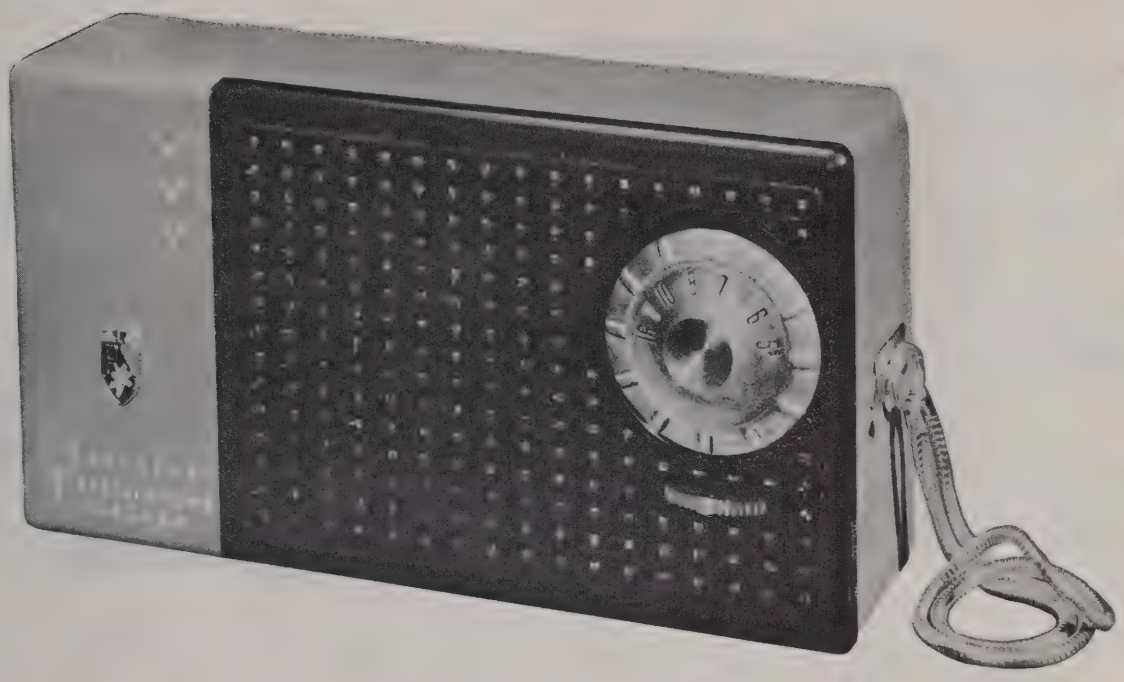
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn set on and tune in a TV station, preferably with a test pattern.
1. Turn contrast control down until the blanking is visible.
2. Set the horizontal hold control to the center of its range.
3. Short out the horizontal oscillator coil (L31) by clipping a .1MFD capacitor from point F to chassis.
4. Adjust the horizontal oscillator control (R6) until equal blanking exists on each side of raster. This can be seen by decentering the picture, first to one side then the other by moving the wobble plate.
5. Remove the shorting capacitor.
6. Adjust the horizontal oscillator slug (B1) until the picture is brought into sync with equal blanking on each side. The wobble plate is used as in step 4 above.
7. Check the pull-in by turning the horizontal hold control until the picture goes out of sync and then slowly bring the picture back in sync. The pull-in should occur between 2½ to 3 bars. If the pull-in is not correct, repeat the above steps. Adjust the width control (R9) for a picture slightly wider than necessary to fill the picture mask horizontally.



CHASSIS TOP VIEW

RAYTHEON MODELS
T-150-1, -2, -3, -4, -5 (Ch. 6RTI)



RAYTHEON MODELS
T-150-1, -2, -3, -4, -5 (Ch. 6RTI)

TRADE NAME	Raytheon Models T-150-1, T-150-2, T-150-3, T-150-4, T-150-5 (Ch. 6RTI)
MANUFACTURER	Raytheon Mfg. Co., TV & Radio Div., 5921 W. Dickens Ave., Chicago 39, Ill.
TYPE SET	Battery Operated Portable Transistor AM Superheterodyne Receiver
POWER SUPPLY	9 Volts "A" Supply
TUNING RANGE—BROADCAST	540KC - 1600KC
RATING	10MA @ 9 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.5MFD	High side to base of X1. Low side to chassis.	455KC (400~ Mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Adjust for maximum output. Repeat.
2.	"	"	1620KC	"	"	A4	Adjust for maximum output.
3.	"	"	535KC	Tuning gang fully closed.	"	A5	"
4.	"	"	1620KC	Tuning gang fully open.	"	A4	"
5.		Loop	1400KC	Tune to 1400KC signal.	"	A6	Adjust for minimum output while rocking tuning gang.

DISASSEMBLY

1. Remove battery.
2. Turn tuning knob stud counterclockwise and remove tuning knob.
3. Remove screw behind tuning knob. Remove case cover.
4. Remove three chassis mounting screws.
5. Remove chassis.

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1956 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under international Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

RAYTHEON
MODEL T-150-1 (Ch. 6RT1)

TRANSISTORS

ITEM No.	USE	TYPE	NOTES
X1	Converter	2N112	Note 1
X2	1st IF Amplifier	2N112	Note 1
X3	2nd IF Amplifier	2N112	Note 1

ITEM No.	USE	TYPE	NOTES
X4	Driver	2N132	
X5	Output	2N138	
X6	Output	2N138	

Note 1: CK-760 may be used in some versions.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	RAYTHEON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	50	10	8C-26454	XPP10V50	EC50-10		ML-50-10		R2279*
C2	6	3	8C-26455	XPP3V6	EC6-3	TAW4A6	ML-6-3		R2280*
C3	50	3	8C-26453	XPP3V50	EC50-3		ML-50-3		TE-1100
C4	50	3	8C-26453	XPP3V50	EC50-3		ML-50-3		TE-1100

* Non catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	10000		8G-26457	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C6	10000		8G-26457	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C7	350		8N1-274							
C8	50000		8G-26459							
C9	10		8L-26471	NP0-S110	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C10	50000		8G-26459							
C11	50000		8G-26459							
C12	10		8L-26471	NP0-S110	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C13	50000		8G-26459							
C14	50000		8G-26459							
C15	50000		8G-26459							
C16	50000		8G-26459							Note 1
C17	1500			BPD-0015	DD-152	K071	801-0015	DC5215	5HK-D15	
C18	20000		8G-26456							

Note 1: Some versions may use .02MFD in this application. (part #8G-26456)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RAYTHEON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	10K	½	B-10A-26383					Volume & Switch

RESISTORS

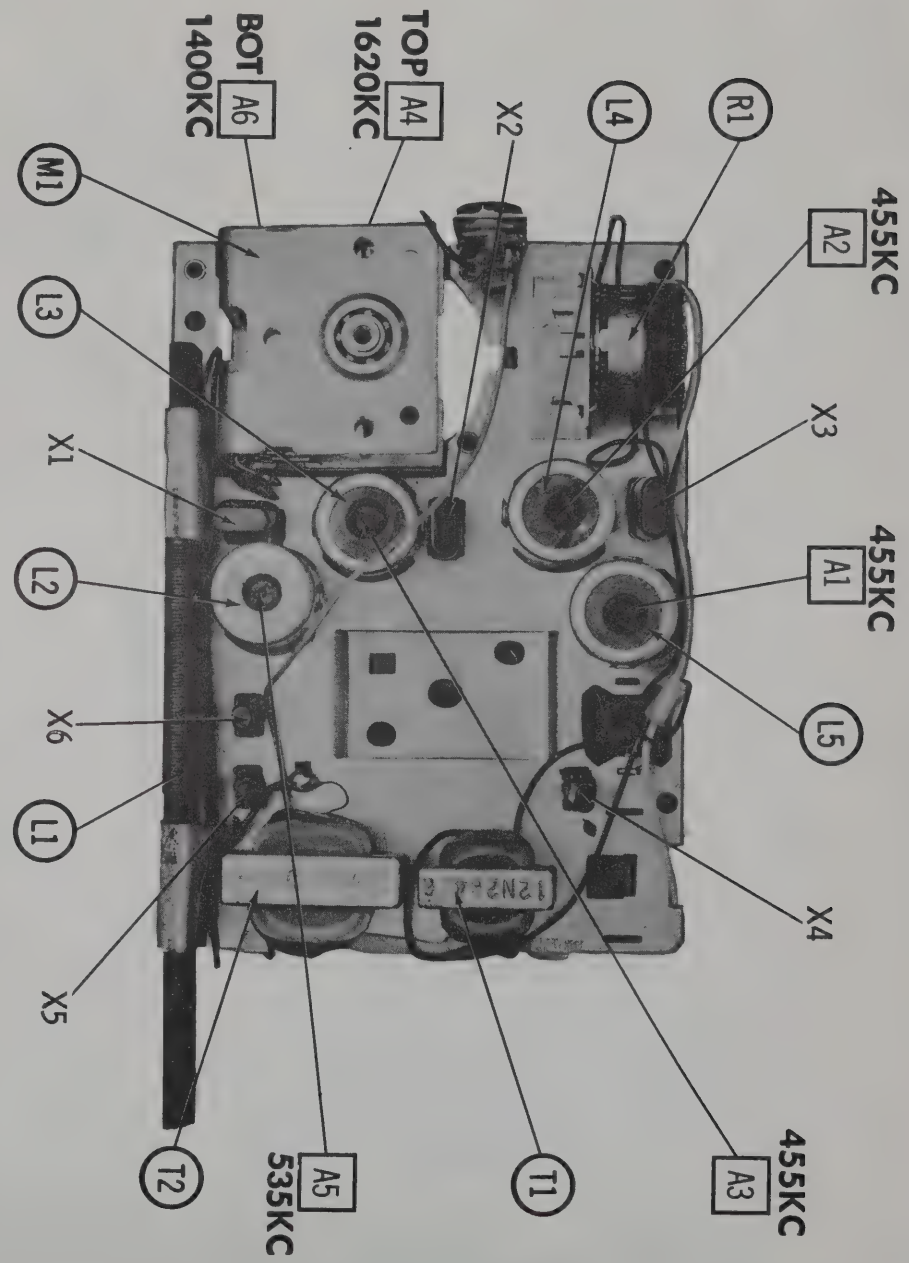
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RAYTHEON PART No.	IRC PART No.	
R2	33K		9B5-80	BTR-33K	
R3	18K		9B5-77	BTR-18K	
R4	5100Ω 5%		9B5-176	BTR-5100 5%	
R5	1000Ω		9B5-62	BTR-1000	
R6	1000Ω		9B5-62	BTR-1000	
R7	1000Ω		9B5-62	BTR-1000	
R8	1000Ω		9B5-62	BTR-1000	
R9	1000Ω		9B5-62	BTR-1000	
R10	1000Ω		9B5-62	BTR-1000	
R11	1000Ω		9B5-62	BTR-1000	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RAYTHEON PART No.	IRC PART No.	
R12	150K		9B5-88	BTR-150K	
R13	6800Ω		9B5-72	BTR-6800	Note 1
R14	6800Ω		9B5-72	BTR-6800	
R15	1500Ω		9B5-64	BTR-1500	
R16	1000Ω		9B5-62	BTR-1000	
R17	10K		9B5-74	BTR-10K	
R18	100Ω		9B5-50	BTR-100	
R19	4700Ω		9B5-70	BTR-4700	
R20	100Ω		9B5-50	BTR-100	
R21	5.6Ω		9C1-1072	BW½-5.6	

Note 1: Not used in some versions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO INPUT)

ITEM No.	RESISTANCE PRI.	RESISTANCE SEC.	REPLACEMENT DATA RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	750Ω	130Ω CT	12N26466				TR-13		
	Turns Ratio 4:1								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	3.1K	19Ω	12C-26465						

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA RAYTHEON PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	2 3/4"	PM	19Ω	18A-26389		22281	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA RAYTHEON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Stick	.1Ω	1.1Ω	13E-26452				
L2	Osc. Coil	.7Ω	4.6Ω*	13D-26379				*Tapped ⓐ .4Ω
L3	1st IF	1.7Ω■	.5Ω	13A-26380				■Tapped ⓐ .7Ω
L4	2nd IF	1.6Ω▲	.5Ω	13M-26381				▲Tapped ⓐ .6Ω
L5	3rd IF	1.6Ω♦	2.3Ω	13B-26382				♦Tapped ⓐ .6Ω

BATTERIES

ITEM No.	VOLTAGE	RAYTHEON PART No.	REPLACEMENT DATA EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
M1	9V "A"	22C-26460	#246			#2N6			

CRYSTAL DIODES

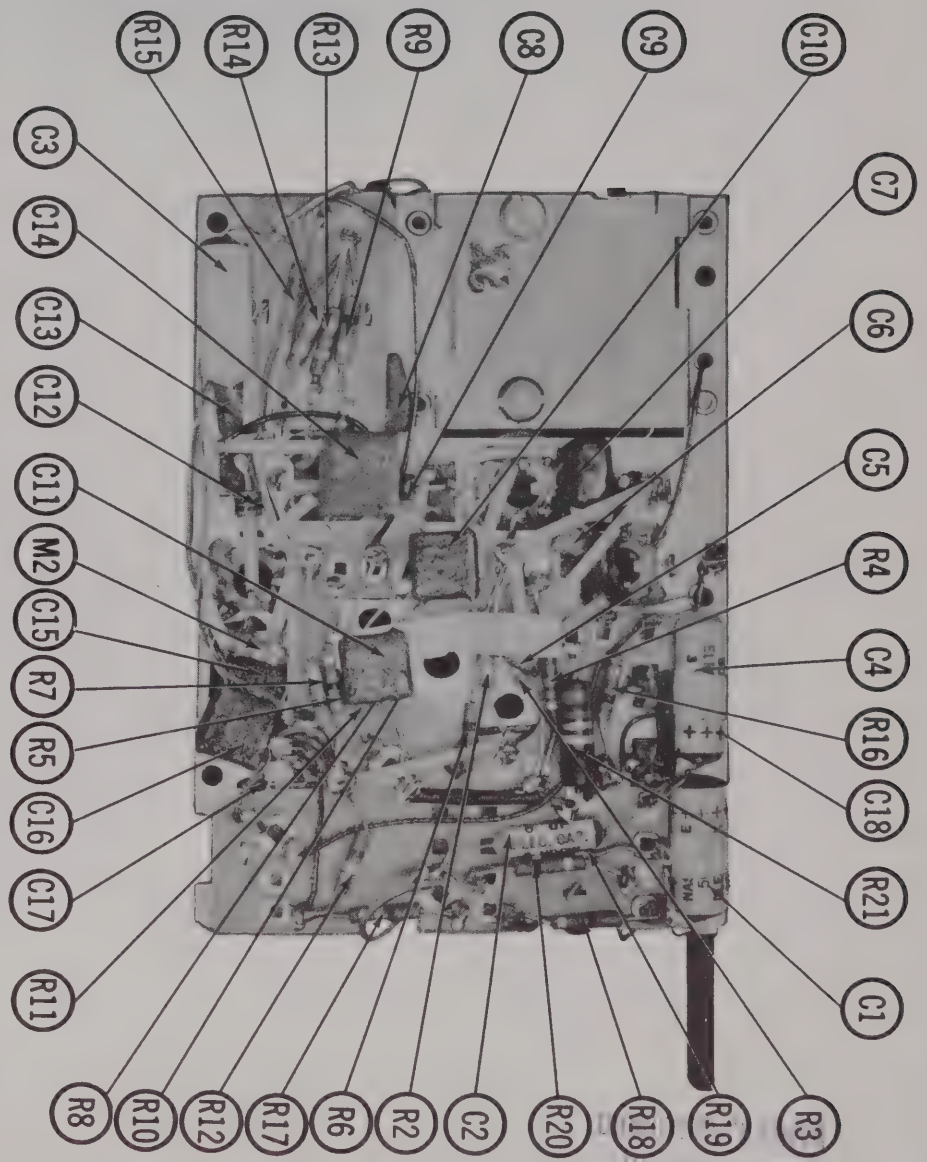
ITEM No.	ORIG. TYPE	REPLACEMENT DATA RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M2	1N295*	1N295 or CK-706A	1N60	Audio Det. (Pigtail)

* Some versions may use crystal diode type CK-706A in this application.

MISCELLANEOUS

ITEM No.	PART NAME	RAYTHEON PART No.	NOTES
M3	Tuning Cap.	8A-26384	2 Gang (17-190MMF, 14-120MMF)
	Case	5C-26178-A206	Models T-150-1, -2.
	Case	5C-26178-A207	Models T-150-3, -4.
	Case	5C-26178-A209	Model T-150-5.
	Case Cover	5C-26179-A208	Models T-150-1, -3.
	Case Cover	5C-26179-A205	Models T-150-2, -4, -5.
	Battery Cover Assy.	200-26449	Models T-150-1, -2.
	Battery Cover Assy.	200-26449-1	Models T-150-3, -4.
	Battery Cover Assy.	200-26449-2	Model T-150-5.
	Knob	200-26408	Tuning
	Knob	5B-26356-A206	On-Off-Volume, Models T-150-1, -3.
	Knob	5B-26356-A207	On-Off-Volume, Models T-150-2, -4.
	Knob	5B-26356-A209	On-Off-Volume, Model T-150-5.

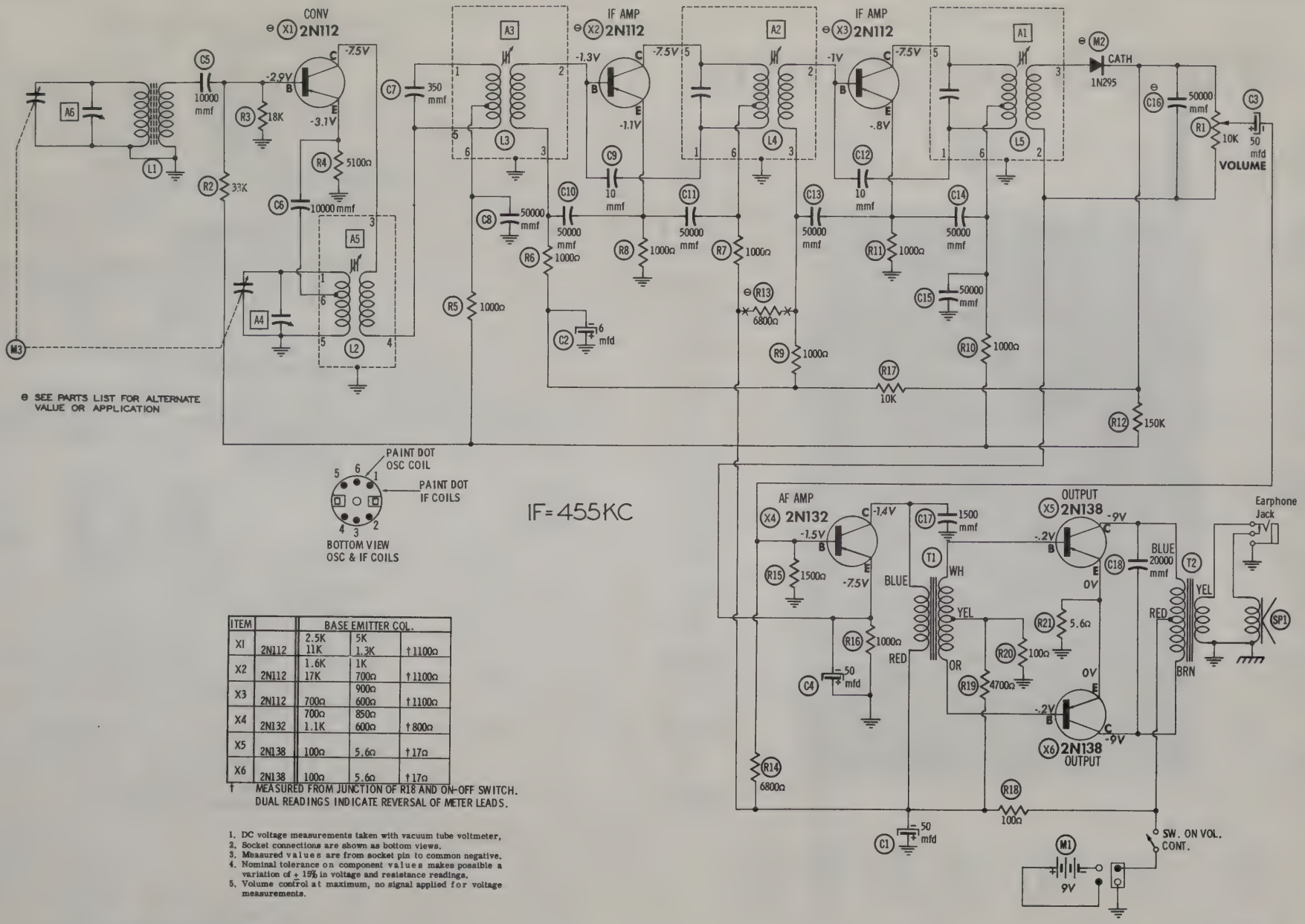
CHASSIS—BOTTOM VIEW



SET 335 FOLDER 13

RAYTHEON MODEL T-150-1 (Ch. 6RT1)

RAYTHEON MODEL T-150-1 (Ch. 6RT1)



ITEM		BASE EMITTER COL.		
X1	2N112	2.5K 11K	5K 1.3K	†1100Ω
X2	2N112	1.6K 17K	1K 700Ω	†1100Ω
X3	2N112	700Ω	900Ω 600Ω	†1100Ω
X4	2N132	700Ω 1.1K	850Ω 600Ω	†800Ω
X5	2N138	100Ω	5.6Ω	†17Ω
X6	2N138	100Ω	5.6Ω	†17Ω

† MEASURED FROM JUNCTION OF R18 AND ON-OFF SWITCH. DUAL READINGS INDICATE REVERSAL OF METER LEADS.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

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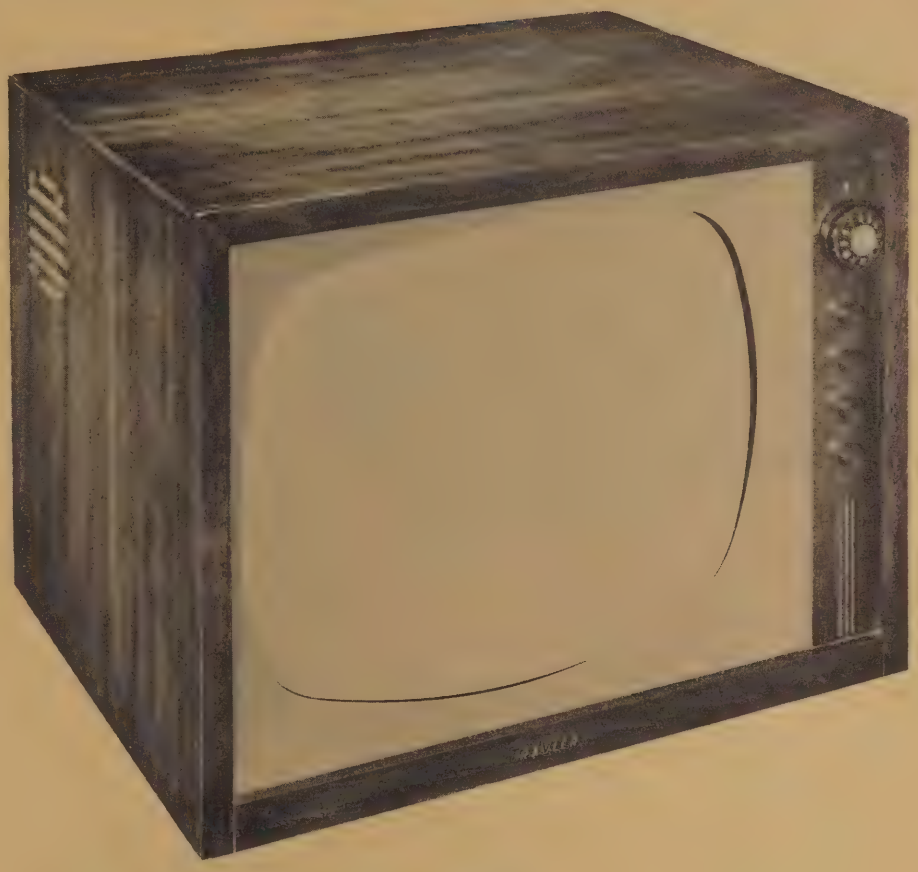

TRAV-LER MODEL 621-74 (Ch. 627-16)

TRADE NAME	Trav-Ler Models 617-73, 621-74, 621-75, 621-76 (Ch. 627-16)
MANUFACTURER	Trav-Ler Radio & Television Corp., 571 W. Jackson Blvd., Chicago 6, Illinois
TYPE SET	Television Receiver
TUBES	Fifteen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.1 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)

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TRAV-LER MODELS 617-73,
621-74, -75, -76 (Ch. 627-16)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 6 push-on type control knobs from front panel of cabinet.

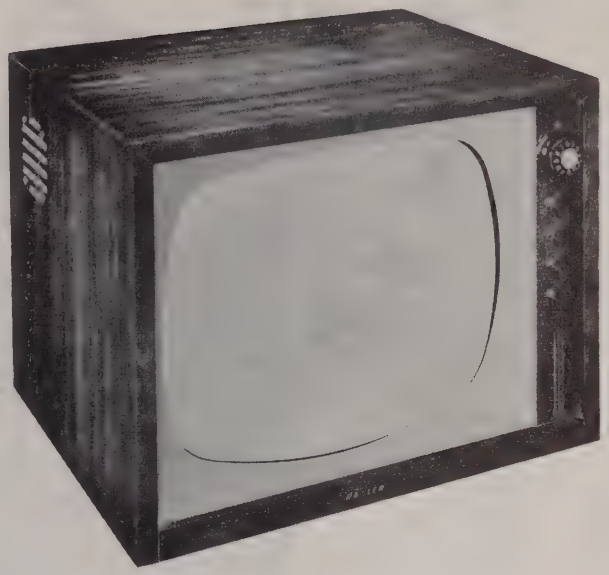
2. Remove 9 wood screws. Remove rear cover.

3. Disconnect speaker leads, picture tube socket, HV lead and yoke plug.

4. Remove 2 chassis bracket screws (1 at the top and 1 at the bottom) holding chassis to cabinet.

5. Slide chassis from cabinet.

6. Remove 4 speaker nuts. Remove speaker.



MODEL	CHASSIS
621-74	627-16

TRAV-LER MODELS 617-73, 621-74, -75, -76 (Ch. 627-16)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

To adjust the horizontal oscillator, it is necessary to remove the rear cover and supply pwer to the set. Set the horizontal hold control at the center of its range and adjust the horizontal frequency coil (L12) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L11) located on top of the chassis.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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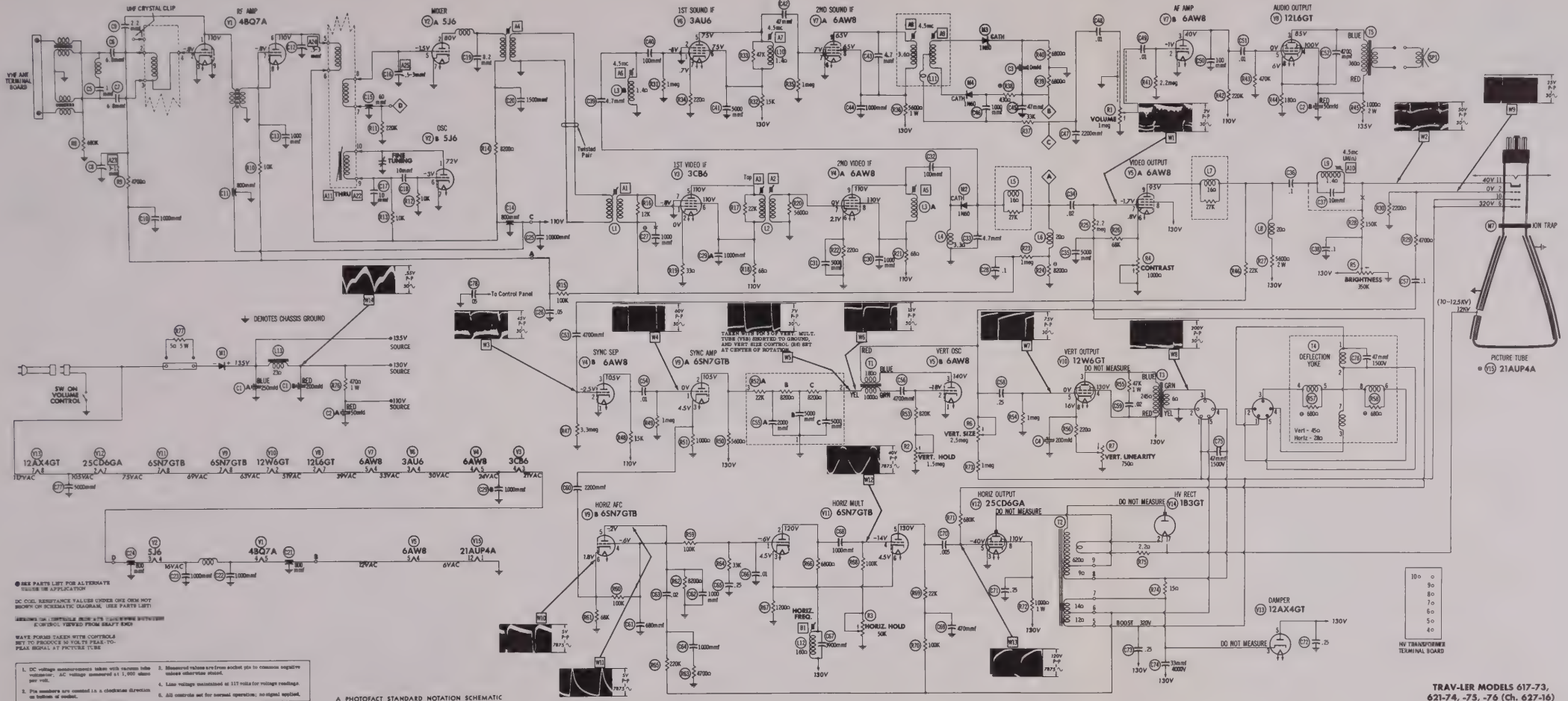
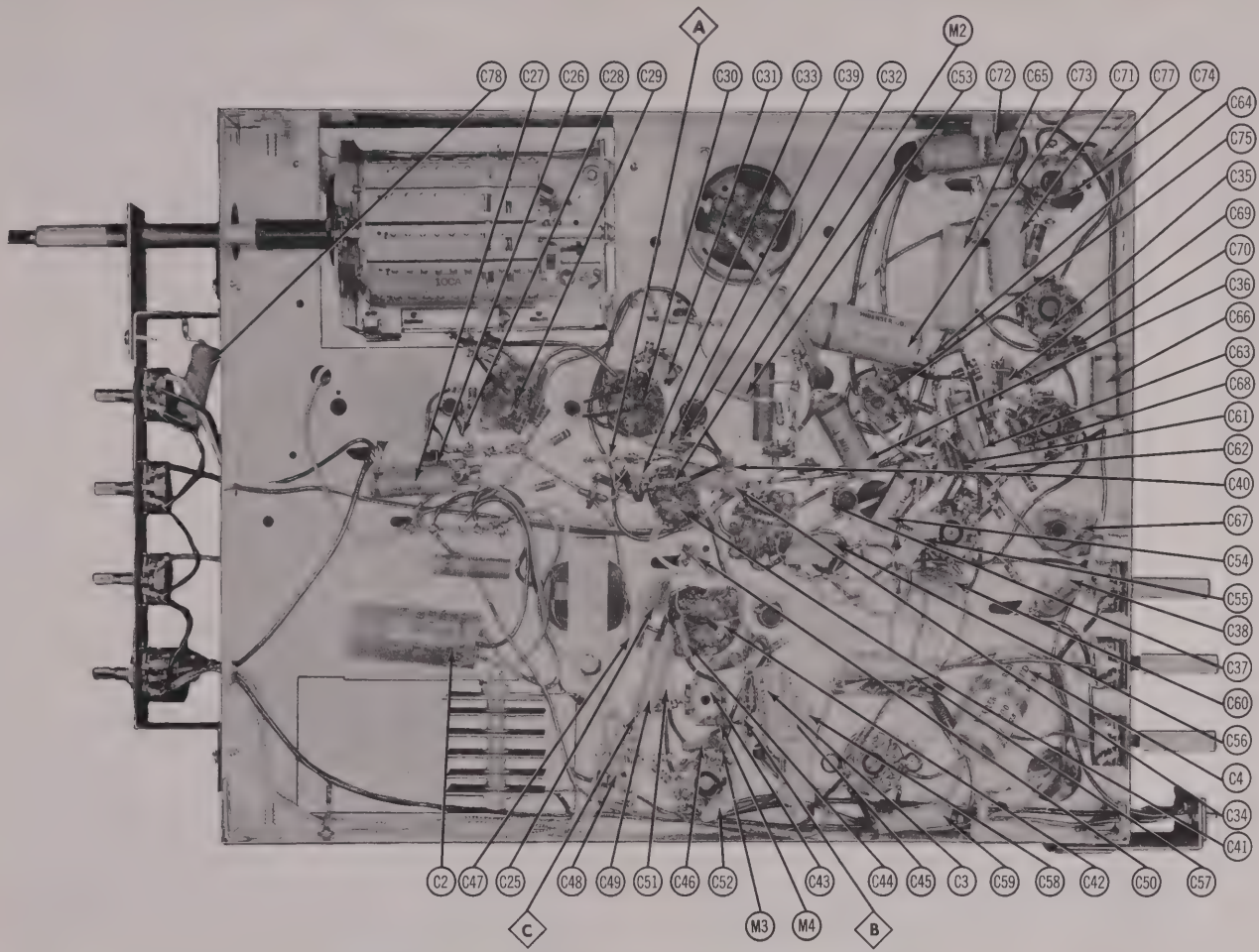
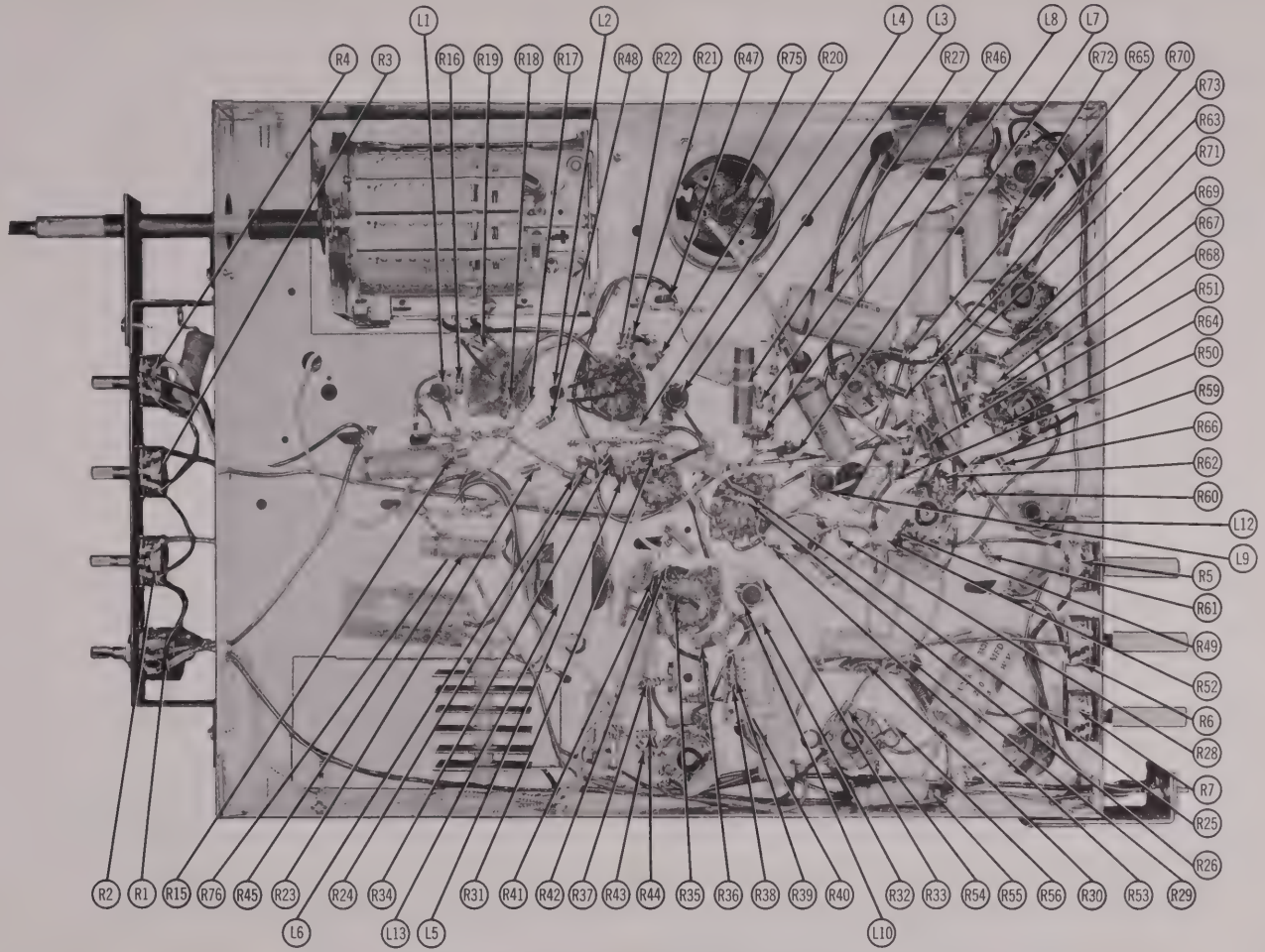


TRAV-LER MODELS 617-73, 621-74, -75, -76 (Ch. 627-16)

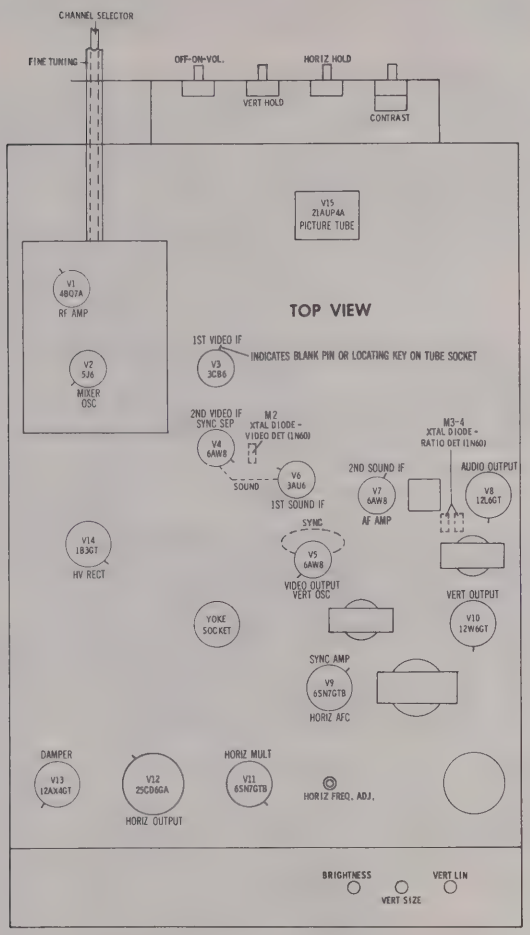


CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

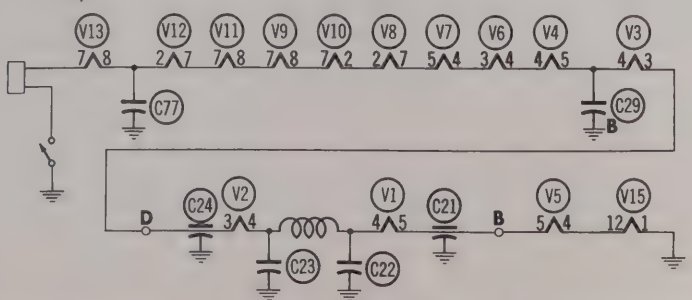
POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifier (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V5, V15
Has pic, no sound - V6, V7, V8

SYNC FAILURE
No vert. sync - V5, V9
No horiz. sync - V9, V11
No vert. or horiz. sync -V4, V9

SWEEP FAILURE
No raster, has sound - V11, V12, V13, V14, V15
No vertical deflection - V5, V10
Poor vert. linearity or foldover - V5, V10
Poor horiz. linearity or foldover - V11, V12, V13
Narrow picture - V11, V12, V13, V14, M1
Vert. off freq. - V5, V9
Horiz. off freq. - V9, V11

NOTE: Since this receiver employs tubes used in a series filament network, an open filament in any tube in series will cause the set to be inoperative (See circuit below).



SET 335 FOLDER 14

TRAV-LER MODELS 617-73, 621-74, -75, -76 (Ch. 627-16)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V11) to disable the high voltage.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt battery to the ungrounded side of C28. Connect the positive lead to chassis. Remove the converter tube (V2) from its socket and replace with a 5J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indicatinns.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.75MC 26.25MC	Any	Vert. Amp. thru 10K to point (A). Low side to chassis.	A1, A2, A3, A4, A5	If necessary, reduce bias to 1.5 volts to obtain usable pattern on scope. Adjust A1 thru A5 to obtain response similar to Fig. 1. A1 and A2 affect the audio side of the response curve. A3 affects the video side. Adjust A4 and A5 for proper symmetry, flatness and bandwidth.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
2.	Direct	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A6, A7, A8	Adjust for maximum deflection.
3.	"	"	"	"	DC probe to point (C). Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Direct	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. thru 10K to point (B). Low side to chassis.	A6, A7, A8	Disconnect stabilizing capacitor (C3). Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
3.	"	"	"	"	"	Vert. Amp. thru 10K to point (C). Low side to chassis.	A9	Reconnect C3. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

Set contrast control for maximum.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	Direct	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru detector (Fig. 4) to pin 11 (cathode) of the picture. Common to chassis.	A10	Adjust for MINIMUM deflection.

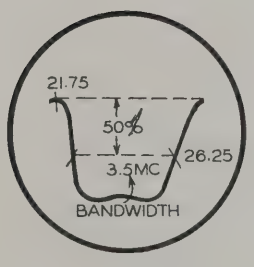


FIG. 1

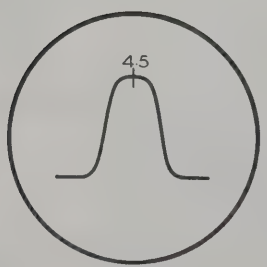


FIG. 2

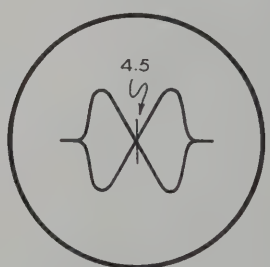


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 5J6 in its socket. The channel oscillator adjustment screws are reached thru a hole just to the left and below the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47K to point (A). Low side to chassis.	A11	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should fall at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A12	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A13	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A14	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A15	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A16	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A17	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A18	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A19	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A20	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A21	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A22	

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10K to point (D). Low side to chassis.	A23, A24, A25	Adjust for response curve similar to Fig. 6 with markers above 90%.
7.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 6.. If markers fall below 70% on any channel, make compromise adjustments of A23, A24 and A25 with channel switch set to that channel. Check all other channel to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

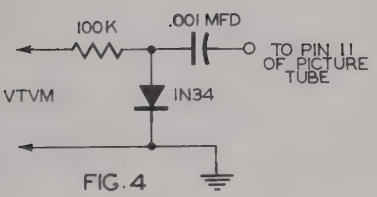


FIG. 4

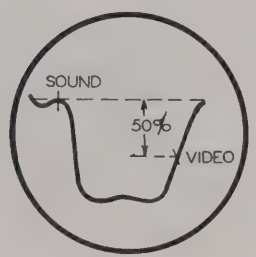


FIG. 5

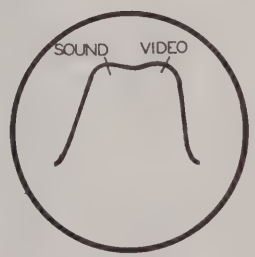
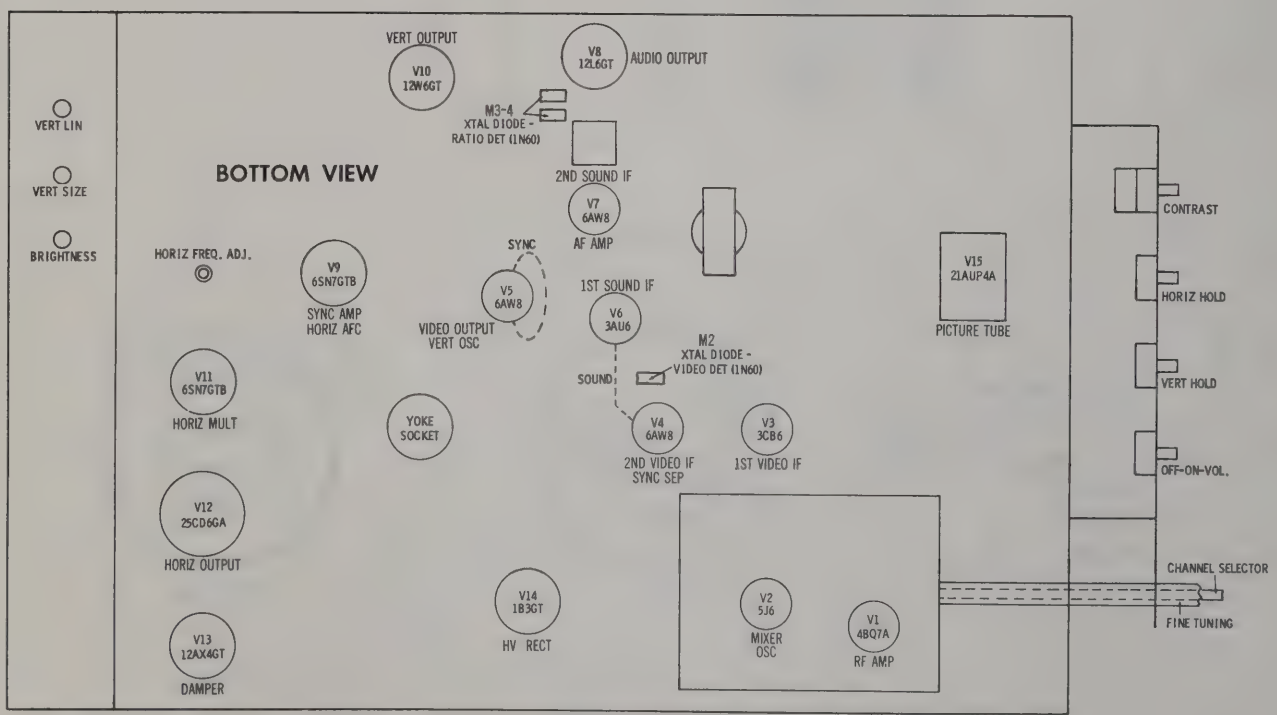


FIG. 6

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	4BQ7A	†500Ω	1Meg	0Ω	4Ω	3Ω	†500Ω	1Meg	0Ω	0Ω
V2	5J6	†10K	†8700Ω	5Ω	4Ω	220K	10K	0Ω		
V3	3CB6	1Meg	33Ω	5Ω	6Ω	†560Ω	†560Ω	0Ω		
V4	6AW8	0Ω	3.3Meg	†15K	8Ω	6Ω	220Ω	.4Ω	†560Ω	†560Ω
V5	6AW8	0Ω	●130K	●▲1.5Meg	2Ω	3Ω	●100Ω	2.2Meg	†23Ω	†5600Ω
V6	3AU6	1Meg	0Ω	9Ω	8Ω	†15K	†15K	220Ω		
V7	6AW8	0Ω	2.2Meg	†220K	9Ω	10Ω	0Ω	1Meg	†5600Ω	†5600Ω
V8	12L6GT	NC	13Ω	†1300Ω	†1000Ω	470K	NC	10Ω	180Ω	
V9	6SN7GTB	1Meg	†5600Ω	1000Ω	170K	8200Ω	68K	17Ω	15Ω	
V10	12W6GT	TP	13Ω	†270Ω	†23Ω	1Meg	NC	15Ω	●650Ω	
V11	6SN7GTB	270K	†7000Ω	1200Ω	●130K	▲120K	1200Ω	18Ω	17Ω	
V12	25CD6GA	NC	22Ω	0Ω	NC	750K	TP	18Ω	†1000Ω	TOP CAP ▲17Ω
V13	12AX4GT	NC	NC	INF	NC	†23Ω	NC	25Ω	22Ω	
V14	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			TOP CAP ▲640Ω
V15	21AUP4A	0Ω	2200Ω	Pin 6 ▲15Ω	Pin 10 ▲15Ω	Pin 11 ●†220K	Pin 12 2Ω			

† MEASURED FROM OUTPUT OF M1.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
▲ MEASURED FROM PIN 3 OF V13.
TP TIE POINT
NC NO CONNECTION



TUBE PLACEMENT CHART

CHASSIS TOP VIEW

TRAV-LER MODELS 617-73, 621-74, -75, -76 (Ch. 627-16)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amp. Mixer-Osc.	6BQ7A	
V2	1st Video IF Amp.	5J6	
V3	2nd Video IF Amp.	3CB6	
V4	3rd Video IF Amp. - Sync Sep.	6AW8	
V5	Video Output-Vert. Osc.	6AW8	
V6	1st Sound IF Amp.	3AU6	
V7	2nd Sound IF Amp. - AF Amp.	6AW8	
V8	Audio Output	12L6GT	
V9	Sync Amp.-Horiz. AFC	8SN7GTB	
V10	Vert. Output	12W6GT	
V11	Horiz. Mult.	8SN7GTB	
V12	Horiz Output	13CB6A	
V13	Damper	12AX4GT	
V14	HV Rectifier	1B3GT	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	Tray-Ler PART No	CBS PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No	
V15	21AUP4A ①	21AUP4A ②	21AUP4A ①		① Aluminized ② Silver Screen "89"
			21AUP4A/B ①	21AUP4A/B ②	
	17HP4B ①	17HP4B ②	17HP4B ①	17HP4B ②	
		17HP4/17HP4	17HP4/17HP4	17HP4/ 17HP4	

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA					
	CAP	VOLT	Tray-Ler PART No	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No
C1A	250	150	TV-EC-47	PRS-313		WT330	CDB-1015	D-095	R3298*
B	100	150							
C2A	50	150	TV-EC-34A	PRS150V5050	BBRD5515	TCD49	TDL-D50-150	FMD-1550	TVA-5453
B	50	150							
C3	10	50	TV-EC-30	PRS50V10	BRI05	TC32	TD-10-50	FM-0510	TVA-1304
C4	200	25	TV-EC-49	PRS25V250	BRH2525	TC50025	TD-250-25	MTH-2525	TVA-1313

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Tray-Ler PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	1			NPO-S2	TC2-1	TZ03	NPOA-S10	ST-5566	5TCCB-V1	
C6	6.8			NPO-D15.5	TC2-5S8	ZO15	NPOA-4S8	ST-5566	5TCCB-V68	
C7	6.8			NPO-D15.5	TC2-6R8	ZO15	NPOA-6R8	ST-5566	5TCCB-V68	
C8	3-13									
C9	3.3			NPO-S13.2	TC2-3R3	ZO06	NPOA-3R3		5TCCB-V32	
C10	1000			BPD-001	DD-102	KD69	801-001	DC521	5HK-D1	
C11	500									
C12	3-3				839-3		3US-01-0R5	CT565A		
C13	1000			BPD-001	DD-102	KD69	801-001	DC521	5HK-D1	
C14	600									
C15	60									
C16	5-3				839-3		3US-01-0R5	CT565A		
C17	10									
C18	10									
C19	8.3			NPO-D18.2		ZO16	[redacted]			
C20	1500			BPD-0015	DD-152	KD75	801-0015	DC3215	5HK-D15	
C21	300									
C22	1000			BPD-001	DD-102	KD69	801-001	DC521	5HK-D1	
C23	1000			BPD-001	DD-102	KD69	801-001	DC521	5HK-D1	
C24	300									
C25	30000			BPD-01	DD-103	KD23	811-01	DC511	5HK-E1	
C26	.05	200		BPD-05	DF-503	CUR265		PT415	2TM-S5	
C27	1000		TV-CC-3	BPD-001	DD-102	KD69	801-001	DC521	5HK-D1	
C28	.1	200	TV-PC-3	P288N-1	DF-104	CUB3P1		PT401	2TM-P1	Note 1
C28A	1000		TV-CC-1	BPD-2X001	DK-059	013-001	DCD251	5HK-ED1		
B	1000									
C30	1000		TV-CC-3	BPD-001	DD-102	KD69	801-001	DC521	5HK-D1	
C31	1000		TV-CC-3	BPD-005	DD-503	KD80	811-005	DC525	5HK-D5	
C32	100		TV-CC-5	SL00	D4-101	TP34	GPUK-101	UC-531	5GA-T1	
C33	4.7		TV-CC-15	NPO-S4.7	TC2-4R7	TZ07	NPOA-4R7	ST-5547	5TCCB-V47	
C34	.03	600	TV-PC-14	BPD-03	DF-303	CUB5S3	817-03		6TM-S3	
C35	5000		TV-CC-3	BPD-001	DD-502	KD80	811-005	DC525	5HK-D5	
C36	.1	600	TV-PC-18	P288N-1	DF-104	CUB3P1		PT401	2TM-P1	
C37	10		TV-CC-31	NPO-SL10	TC2-10	TZ09	NPOA-100	ST-541	5TCC-Q	
C38	.1	200	TV-PC-3	P288N-1	DF-104	CUB3P1		PT401	2TM-P1	
C39	4.7		TV-CC-15	NPO-S4.7	TC2-4R7	TZ07	NPOA-4R7	ST-5547	5TCCB-V47	
C40	100		TV-CC-5	SL00	D4-101	TP34	GPUK-101	UC-531	5GA-T1	
C41	5000		TV-CC-3	BPD-005	DD-502	KD80	811-005	DC525	5HK-D5	
C42	47		TV-CC-13	SH47	D5-470	TP39	GPUK-470	UC-5447	5GA-Q47	
C43	4.7		TV-CC-15	NPO-S4.7	TC2-4R7	TZ07	NPOA-4R7	ST-5547	5TCCB-V47	
C44	1000		TV-CC-7	SH100	D4-102	TP32	GP3L-103	UC-531	5GA-D1	
C45	47		TV-CC-13	SH47	D5-470	TP39	GPUK-470	UC-5447	5GA-Q47	
C46	1000		TV-CC-7	1464-0041		1RSD1	811-103	MCB555	M8-21	
C47	1200	500	TV-MC-11	1464-0023		1RSD12			M8-323	
C48	.01	600	TV-PC-18	BPD-01	D4-103	CUB4S1	GP3-333-103	PT411	6TM-S1	
C49	.01	600	TV-PC-7	BPD-01	D4-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C50	100	500		SL00	D4-101	1WT1	GPUK-101	MC355	1FM-S1	
C51	.01	400	TV-PC-7	BPD-01	D4-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C52	.047	500	TV-CC-36	BPD-047	DD-473	KD79	811-047	DC-5347	5HK-D47	
C53	4700	500		BPD-004W	DD-472	1WD47	811-0047	UC-5347	1FM-247	
C54	.01	600	TV-PC-15	BPD-01	D4-103	CUB4S1	GP3-333-103	PT411	6TM-S1	
C55A	2000							DC522		
B	5000		†TV-CC-36	†PA-110	†PC-100	†1ST301	†1406-01	DC525	†V-1	
C	5000							DC525		
C56	4700	500		1464-0047		1RSD47			M8-347	
C57	.1	200	TV-PC-3	P288N-1	DF-104	CUB3P1		PT401	2TM-P1	
C58	.33	200	TV-PC-4	P288N-33		CUB3P15		PT4025	2TM-P25	
C59	.02	600	TV-PC-14	BPD-02	DF-203	CUB3S3	817-03	PT413	6TM-S3	
C60	2200	500	TV-MC-11	1464-0033		1RSD33			M8-333	
C61	680	500		1464-00068	D6-681	1RST68	[redacted]		M8-368	
C62	1000		TV-CC-7	SL000	D4-102	TP32	GP3L-103	UC-531	5GA-D1	
C63	.03	600	TV-PC-14	BPD-03	DF-303	CUB3S3	817-03	PT413	6TM-S3	
C64	1000		TV-CC-7	SL000	D4-102	TP32	GP3L-103	UC-531	5GA-D1	
C65	.33	200	TV-PC-4	P288N-33		CUB3P15		PT4025	2TM-P25	
C66	.01	600	TV-PC-15	BPD-01	D4-103	CUB4S1	817-02	PT413	6TM-S3	
C67	3900	500	TV-MC-12	1464-0039		1RSD39			M8-339	
C68	1000	500	TV-CC-7	1464-001		1RSD1	811-103	MC366	M8-21	
C69	4700			1464-00047	D5-471	1RST47	811-471		M8-347	
C70	.005	600		BPD-005	DD-503	KD80	811-005	DC525	6HK-D5	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Tray-Ler PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C71	.25	200	TV -PC-4	P288N-25		CUB2P25		PT4025	2TM-P25	
C73	.25	200	TV-PC-4	P288N-25		CUB2P25		PT4025	2TM-P25	
C74	.25	600		P668N-25		CUB6P25		PT6025	6TM-P25	
C74	.33	400		HVD-50-33			83Y-330		50GAB-Q33	
C75	.47	3500		HVD-15-47	DD39-470	V3Q47	3KY-470	DC30447	30GA-Q47	
C76	.47	1500		HVD-30-47	DD30-470	V3Q47	3KY-470	DC30447	30GA-Q47	
C77	5000		TV-CC-3	BPD-005	DD-502	KD80	811-005	DC525	5HK-D5	
C78	.05	600		BPD-09	DF-503	CUB6S5		PT615	6TM-S5	

† Items C58A, C58B, C58C, R53A, R53B and R53C are combined in one unit.
Note 1: Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA						INSTALLATION NOTES
	RESIST-ANCE	WATTS	Tray-Ler PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.		
R1A	1Meg	½	TV-VC-51	AB-70	A47-1Meg-2	Q13-137	U-53	Volume	
B	Shaft		Not Req.	AE-4	ES8-3	Not Req.	Not Req.	Attach to R1A	
C	Switch		Not Req.	KD-1	SW2-11	78-1	UJ-35	Attach to R1A	
R2A	1 Meg	½	TV-VC-53	AB-74S	A47-1Meg-S	Q11-138	TA185L	Vert. Hold	
B	Shaft		Not Req.	AE-4	ES8-3	Not Req.	Not Req.	Attach to R2A	
R3A	50K	½	VC-72	AB-31	A47-50K-S	Q11-133	TA54L	Horiz. Hold	
B	Shaft		Not Req.	AE-4	ES8-3	Not Req.	Not Req.	Attach to R3A	
R4A	1000Ω	½	VC-61	AB-5	A47-1000-S	Q11-109	TA181.	Contrast	
B	Shaft		Not Req.	AE-4	ES8-3	Not Req.	Not Req.	Attach to R4A	
R5A	350K	½	VC-74	AB-58	A47-300K-S	Q11-123	TA58L	Brightness	
B	Shaft		Not Req.	AE-1	RN-3	Not Req.	Not Req.	Attach to R5A	
R6A	2.5Meg	½	VC-78	AB-83	A47-2.5Meg-S	Q11-139	BU-556	Vert. Size	
B	Shaft		Not Req.	AE-19	RN-3	TQ	Not Req.	Attach to R6A	
R7A	750Ω	½	VC-77	AB-8	A47-750-S	Q11-105	PTA7DL	Vert. Linearity	
B	Shaft		Not Req.	AE-19	RN-3	TQ	Not Req.	Attach to R7A	

RESISTORS

All wattages 1/2-watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	OHMS	WATT	Tray-Ler PART No.	IRC PART No.		
R3	680K			BTS-680K		
R9	470Ω			BTS-4700		
R10	10K			BTS-10K		
R11	330K			BTS-330K		
R12	10K			BTS-10K		
R13	10K			BTS-10K		
R14	8200Ω			BTS-8200		
R15	100K		TV-IR-43	BTS-100K		
R16	33K					
R17	33K		TV-IR-45	BTS-33K		
R18	68Ω			BTS-68		
R19	33Ω			BTS-33		
R20	5600Ω		TV-IR-53	BTS-5600		
R21	68Ω			BTS-68		
R22	330Ω		TV-IR-5	BTS-330		
R23	1Meg		TV-IR-55	BTS-1Meg		
R24	6800Ω		TV-IR-50	BTS-6800	Note 1	
R25	2.5Meg		TV-IR-12	BTS-2.5Meg		
R26	68K		TV-IR-41	BTS-68K		
R27	5600Ω	2	TV-IR-125	BTS-5600		
R28	150K		TV-IR-105	BTS-150K		
R29	4700Ω		TV-IR-48	BTS-4700		
R30	2200Ω		TV-IR-47	BTS-2200		
R31	1Meg		TV-IR-105	BTS-1Meg		
R32	15K		TV-IR-53	BTS-15K		
R33	47K		TV-IR-48	BTS-47K		
R34	330Ω		TV-IR-5	BTS-330		
R35	1Meg		TV-IR-105	BTS-1Meg		
R36	5600Ω	1		BTA-5600		
R37	33K		TV-IR-56	BTS-33K		
R38	4500 Ω%			BTS-430 0%	Note 3	
R39	6800Ω		TV-IR-76	BTS-6800		
R40	6800Ω		TV-IR-76	BTS-6800		
R41	2.5Meg		TV-IR-12	BTS-2.5Meg		
R42	33K		TV-IR-01	BTS-330K		
R43	470K		TV-IR-11	BTS-470K		

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Tray-Ler PART No.	IRC PART No.	
R44	180Ω			BTS-180	
R45	1000Ω	2		BTS-1000	
R46	22K		TV-IR-45	BTS-22K	
R47	2.5Meg			BTS-2.5Meg	
R48	15K		TV-IR-53	BTS-15K	
R49	1Meg		TV-IR-105	BTS-1Meg	
R50	5600Ω		TV-IR-53	BTS-5600	
R51	1000Ω			BTS-1000	
R52A	22K			BTS-22K	
B	62000Ω		†TV-CC-26	BTS-8200	
C	8200Ω			BTS-8200	
R53	820K 5%		TV-IR-116	BTS-820K 5%	
R54	1Meg 5%		TV-IR-106	BTS-1Meg 5%	
R55	47K	1	TV-IR-120	BTS-47K	
R56	220Ω		TV-IR-5	BTS-220	
R57	680Ω				Note 3
R58	680Ω				Note 3
R59	10K		TV-IR-54		
R60	100K		TV-IR-64		
R61	68K		TV-IR-61		
R62	8200Ω		TV-IR-68		
R63	4700Ω		TV-IR-48		
R64	15K		TV-IR-53		
R65	330K		TV-IR-91		
R66	6800Ω		TV-IR-76		
R67	1200Ω			BTS-1200	
R68	100K		TV-IR-63		
R69	33K		TV-IR-45		
R70	100K		TV-IR-63		
R71	680K				
R72	1000Ω	1			
R73	1Meg 5%		TV-IR-105	BTS-1Meg	
R74	15Ω				
R75	2.2Ω 5%			BW½-2.2	
R76	470Ω	1		BTA-470	
R77	5Ω	5	TV-F-6		

† Items R52A, R52B, R52C, C55A, C55B and C55C are combined in one unit.
Note 1: Some versions use a 5600Ω resistor in this application. (part #TV-IR-52)
Note 2: Some versions use a 470Ω resistor in this application. (part #TV-IR-6)
Note 3: Some versions use a 560Ω resistor in this application.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA								
		Tray-Ler PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	Vert. Osc. Trans.	TV-TR-23	D6702	A-3003	309T1 ①	Y405	A-8125	26A03	A-27X	
T2	Horiz. Output Trans.	TV-TR-20	FB41P1②	EVO-30*④	235T1*①	3094*①	A-8180*④	FLT-10*④	D-30*①④	
				①				①		
T3	Vert. Output Trans.	TV-TR-21	21Q03 ③	A-3012 ①		V31A ③	A-8147 ③	26G71 ①	A-02X ①	
T4A	Yoke Horiz. (50MC)	TV-L-71	DF80C ③ ⑤	MDF-75 ③	232D1 ③ ⑤	P70P30/43 ⑤	BY-11A ③ ⑤	T-50 ③ ⑤	Y-32 ①③ ⑤	
B	Vert. (45MC)									

① Drill new mounting hole(s).
② Use 5 to 1 horiz ratio.
③ Connect blue lead to plate (pin #3 of V10); Connect green lead of transformer to green lead of yoke (yoke socket pin #3). Remove red lead of yoke (yoke socket pin #2) from ground and connect it and red lead of trans. to pin #4 of V10 (B+).
④ Connect blue lead to plate (pin #3 of V10); Connect black lead of trans. to green lead of yoke (yoke socket pin #3). Remove red lead of yoke (yoke socket pin #2) from ground and connect it and red lead of trans. to pin #4 of V10 (B+).
⑤ May require new centering device.
⑥ Use original horiz. yoke damping network.
* This part may be superceded by parts manufacturer's introduction of special unit for this application.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	9	9	9	9	9	3	9	9
	8	7	7	7	3	7	7	7
	7	7	7	7	2	8	7	7
	N.C. See Note ②	N.C. See Note ②	N.C. See Note ①	N.C. See Note ①	N.C. See Note ②	N.C. See Note ①	N.C. See Note ①	N.C. See Note ①
	5	1	1	1	1	5	1	1
Special Notes	②	②	②	②	②	②	②	②

① To reduce yoke "ringing", remove capacitor C78 from horiz. yoke terms #1 and #2, and connect it (in series with 1000Ω, 1W) across horiz. yoke terms #3 and #5.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI	SEC	Tray-Ler PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T5	4.25K	3-4Ω	AT-16	21D7	A-3930	A-3850	24S80	S-8LX	

SPEAKER

ITEM No.	RATINGS				REPLACEMENT DATA			NOTES
	SIZE	FIELD	V C	IMP	Tray-Ler PART No.	QUAM PART No.	RCA TYPE No	
SP1	5"	PM		3-4Ω	SPK-36	8A07	30S63	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI	SEC	Tray-Ler PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	1st Video IF	.1Ω	.1Ω	TV-L-74				
L2	2nd Video IF	.6Ω	.6Ω	TV-L-78				
L3A	3rd Video IF	.8Ω		TV-L-72				
B	1st Sound IF	1.4Ω						
L4	RF Choke	3.5Ω		TV-L-30	19-1005		4612	11 Microhenries
L5	Series Peaking Coil	18Ω		TV-L-86	19-3300*	TV-190*	6132*	330 Microhenries; Wound on 2.7K resistor
L6	Shunt Peaking Coil	20Ω		TV-L-65	19-3980		6148	680 Microhenries
L7	Series Peaking Coil	18Ω		TV-L-86	19-3300*	TV-190*	6132*	330 Microhenries, Wound on 2.7K resistor
L8	Shunt Peaking Coil	20Ω		TV-L-65	19-3980		6148	680 Microhenries
L9	4.5MC Trap	1.4Ω		TV-L-1EB	20-1006*	TV-181*	1469*	
L10	2nd Sound IF	1.4Ω		TV-L-4C				
L11	Ratio Det.	2.8Ω	L. SEC†	TV-L-7	17-3497	TV-118	6305	Tertiary winding = .8Ω

* Parallel with 27K resistor.
n Drill new mounting hole.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI	SEC	Tray-Ler PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L12	160Ω		TV-L-64	19-1070*	TV-169*	6310*			HH-5*	

* Enlarge mounting hole.

FILTER CHOKE

ITEM No	RATINGS			REPLACEMENT DATA						NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE @ CURRENT 1000 Cy.	Tray-Ler PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
L13	.265A	25Ω	6HY	FC-3				C-33X ①	26C44 ①	

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Tray-Ler PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.300A	SR-7	1341A	HS400	6S400	6S4	400	

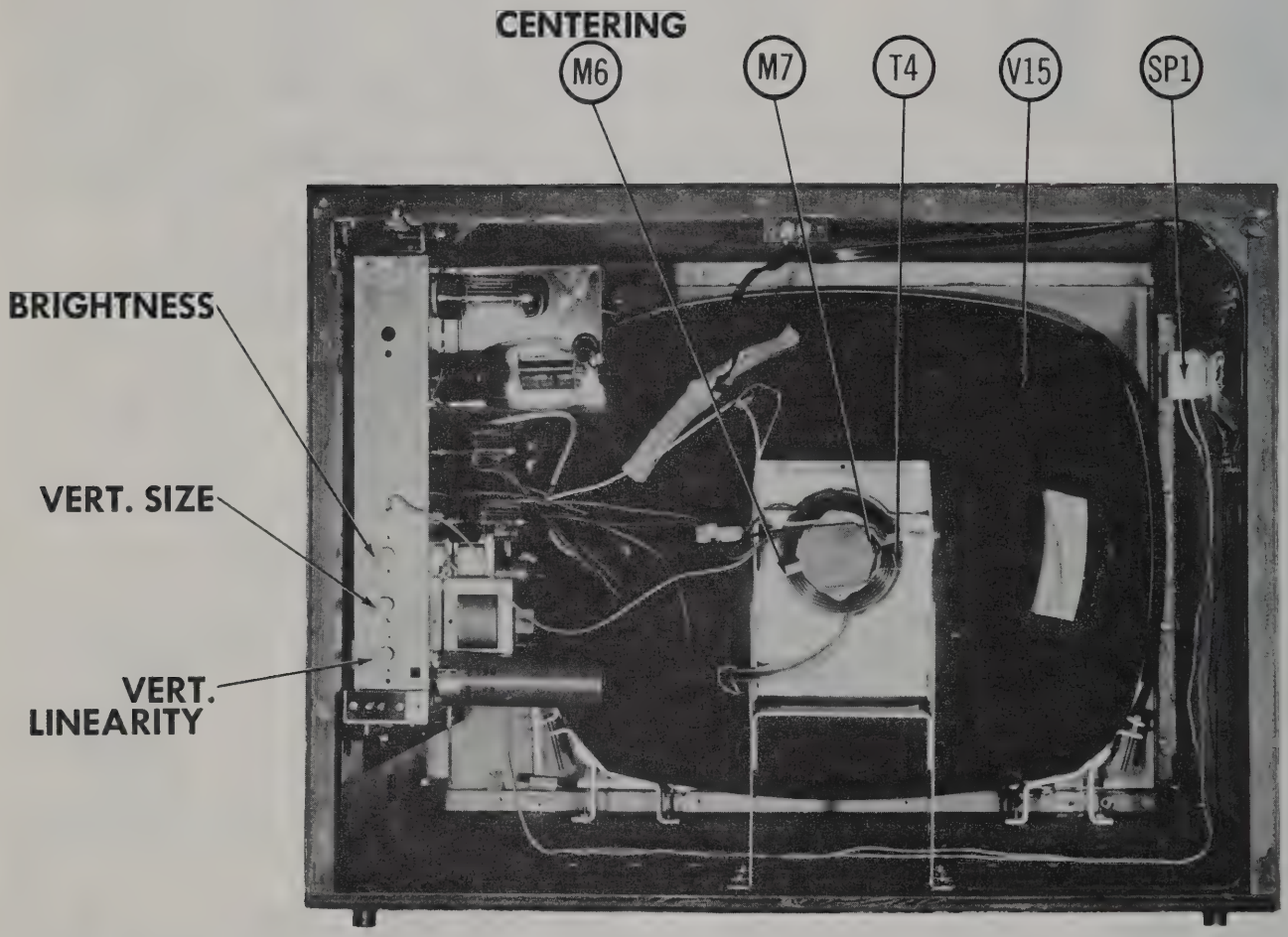
CRYSTAL DIODES

ITEM No.	OSC. TYPE	REPLACEMENT DATA		
		Tray-Ler PART No.	SYLVANIA PART No.	NOTES
M2	IN60		1N60	Video Det. (Pigtail)
M3	IN60		1N60	Ratio Det. (Pigtail)
M4	IN60		1N60	Ratio Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	Tray-Ler PART No.	NOTES
M5	Tuner	TA-37	VHF
M6	Centering Device		Part of deflection yoke (T4), rear cover.
M7	Ion Trap	TV-MA-7	

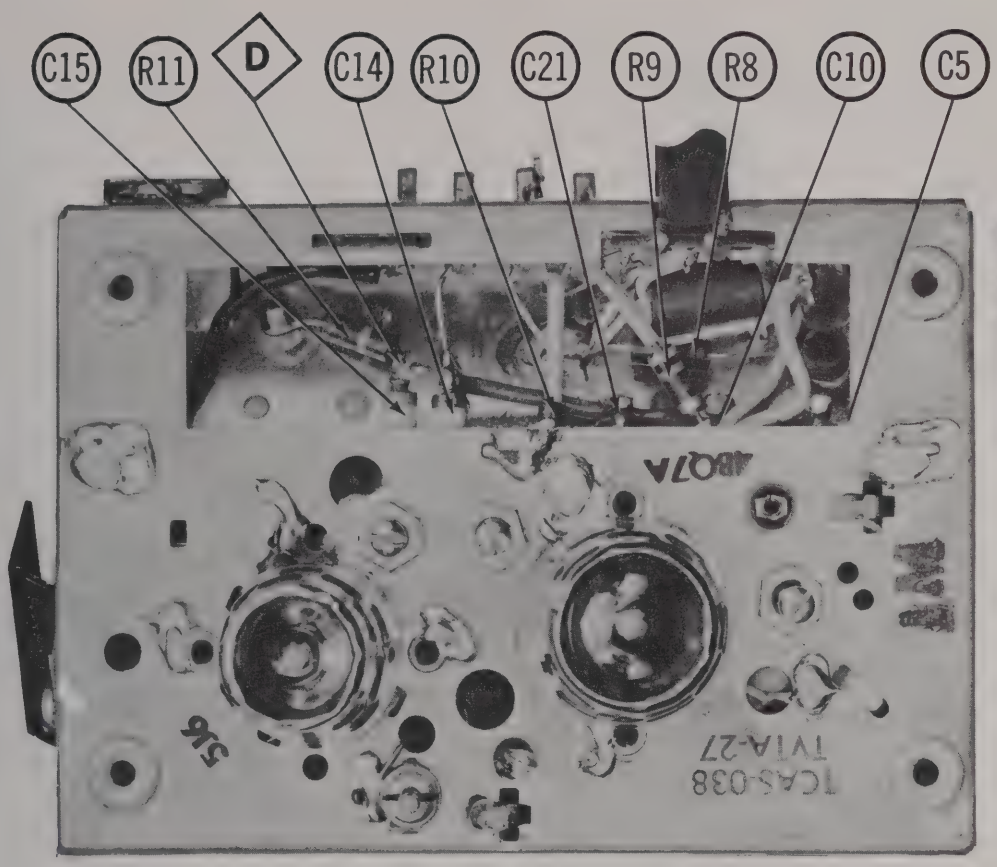
TRAV-LER MODELS 617-73, 621-74, -75, -76 (Ch. 627-16)



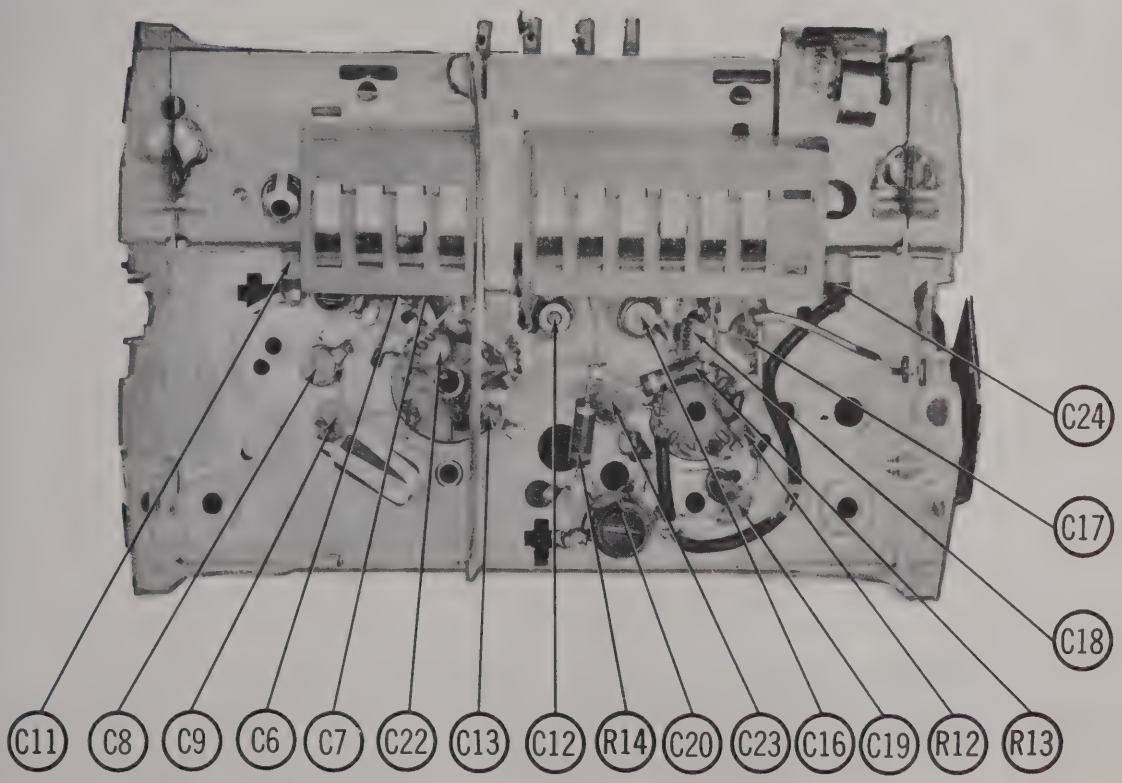
CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Set the horizontal hold control at the center of its range. Adjust the horizontal frequency coil slug (B1) until the picture synchronizes horizontally. Momentarily remove the signal by switching off channel and back again. If the picture does not pull back, retouch B1. Repeat this procedure until proper sync action is obtained.



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW

TRUETONE MODELS
D5606A, D5609A

TRUETONE MODELS
D5606A, D5609A

TRADE NAME	Truetone Models D5606A, D5609A
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	AC Operated AM Superheterodyne Receiver With 3 Speed Automatic Record Changer (Model D5609A)
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-125 Volts AC-60 Cycles RATING .23 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	550KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna lug on tuning gang. Low side to B-.	455KC (400∿Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1610KC	"	"	A5	"
3.	"	"	540KC	Tuning gang fully closed.	"	A6	"
4.		Loop	1400KC	Tune to 1400KC signal	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

FOR SERVICE INFORMATION ON 3 SPEED RECORD CHANGER - SEE SIMILAR V-M MODEL 950 - PHOTOFACT SET 216 FOLDER 11 OR RECORD CHANGER MANUAL CM-5.

FOR SERVICE INFORMATION ON 4 SPEED RECORD CHANGER PART NO. RC-22 - SEE SIMILAR V-M MODEL 1200 - PHOTOFACT SET 290 - FOLDER 11 OR RECORD CHANGER MANUAL CM-7

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PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D5606A

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		TRUETONE PART No.	STANDARD REPLACEMENT	
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det.-AVC-AF Amplifier	12AV6	12AV6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	EC-35	PRS150V5050	BBRD5515	TCD49	TDLD-8	MTD-1550	TVA-2453
B	50	150							
C2	5	25	EC-34	PRS150V4	BR550	TC30	TD-5-25	MMT-0505	TVA-1203

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	220		CC-33	BPD-00022	DD-221	G051	GP2K-221	UC-5322	5GA-T22	
C4	.05	400	PC-5	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C5	47		CC-12	SI47	D6-470	TP29	831-470	UC-5447	5GA-Q47	
C6	100		CC-5	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C7	.05	400	PC-5	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C8	.01	600	PC-7	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C9	3300		CC-36	1464-0033		1R5D33			MS-233	
C10	150	500		NP0-SI150	TCZ-150	5R5T15		MCB236	MS-315	Note 1
C11	.01	600	PC-7	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C12	.01	600	PC-7	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C13	.047	400	PC-21	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C14	.05	400	PC-5	BPD-05	DF-503	CUB4S47		PT415	4TM-S5	

Note 1. Some versions use 100MMF in this application (part #CC-5).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	VC-4	AB-70	A47-1Meg-Z	Q13-137	U-53	Volume (Note 1)
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A

Note 1. Part No. VC-75 used in Model D5606A

RESISTORS

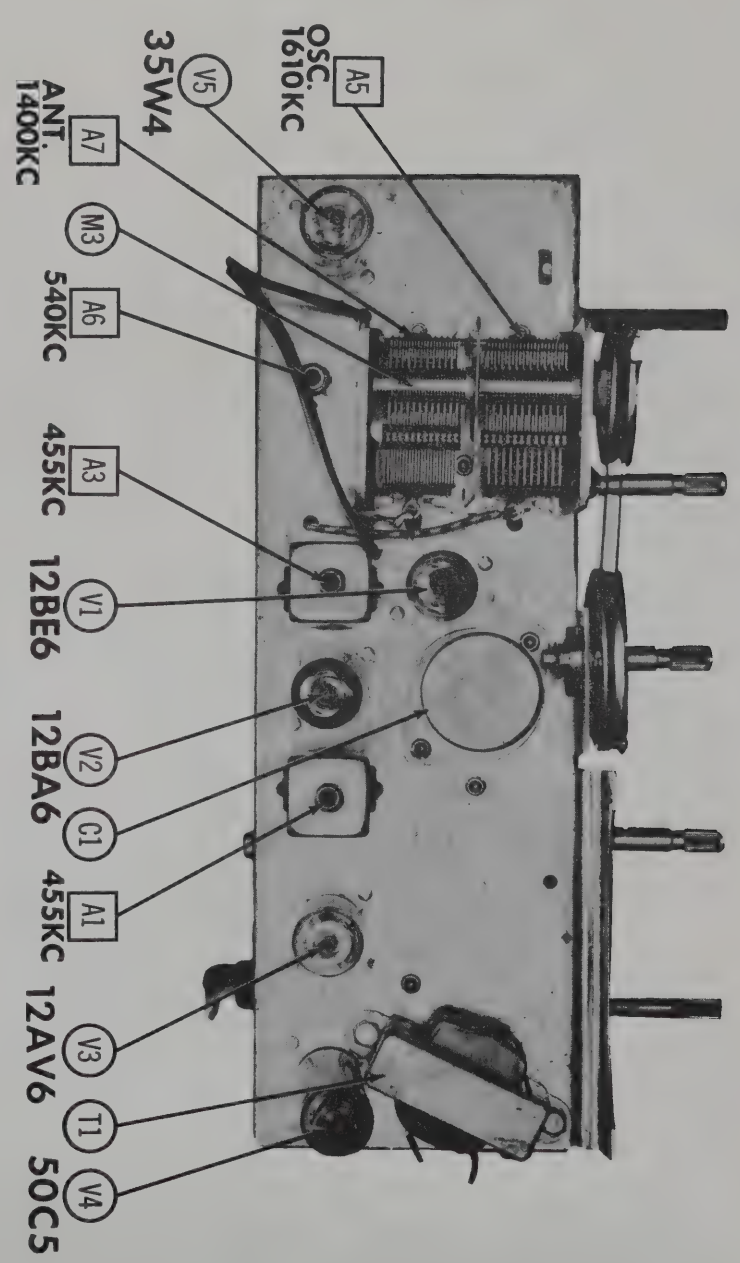
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TRUETONE PART No.	IRC PART No.	
R2	33Ω		IR-17	BTS-33	
R3	22KΩ		IR-9	BTS-22K	
R4	1Meg 5%		IR-12	BTS-1Meg	
R5	3.3Meg		IR-23	BTS-3.3Meg	
R6	220Ω		IR-114	BTS-220	
R7	2.2Meg		IR-13	BTS-2.2Meg	
R8	470KΩ		IR-11	BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TRUETONE PART No.	IRC PART No.	
R9	47KΩ		IR-10	BTS-47K	
R10	470KΩ		IR-11	BTS-470K	
R11	1000Ω		IR-42	BTA-1000	
R12	220Ω		IR-114	BTS-220	
R13	33Ω		IR-17	BTS-33	
R14	220KΩ		IR-20	BTS-220K	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.4KΩ	3.4Ω	AT-14	Z1102	A3031	A3336	24S50A	S-16X	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	TRUETONE PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3.4Ω	SPK-38	4A1	30482	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1.7Ω		LL-39				
L2	Osc. Coil	.8Ω	6.3Ω	LO-21	14-1060	BC-387	71-OSC	
L3	Input IF	25Ω	25Ω	LI-13	16-6758	BC-352	12-C1	
L4	Output IF	25Ω	25Ω	LI-13	16-6758	BC-353	12-C2	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	TRUETONE PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	PU-17	55-T	GD-J	47	0-1 or S-1 & 0-3	Use with Model D5606A
M1	TO-284-0V			46-T	0-1 or S-1 & 0-3	Use with Model D5609A

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

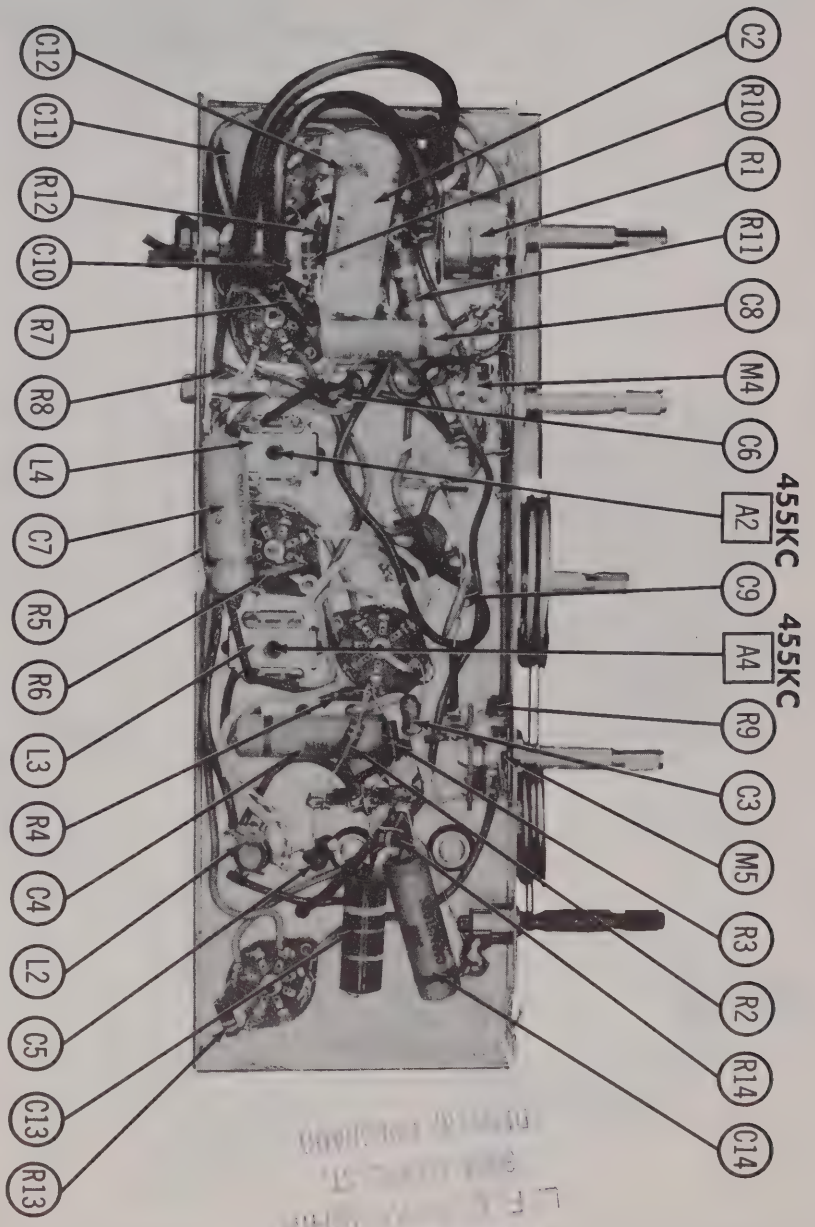
ITEM No.	REPLACEMENT DATA				REMARKS
	TRUETONE PART No.	FIDELITONE PART No.	JENSEN PART No.	WALCO PART No.	
M2	(Note 1)	†AC-130 or ♦†AC-130D1 or ♦AC-130D	†S-66 or ♦†S-66SD or ♦S-66D	†W-75TPS or ♦†W-75DS or ♦W-75TPD	† Jewel ♦ Diamond
M2	(Note 2)	†A-142 or ♦A-142D and †C-143 or ♦C-143D	†CR-55LP or ♦CR-55LPD and †CR-55 or ♦CR-55D	†W-64MGS or ♦W-64MGD and †W-645 or ♦W-64D	

Note 1. Use with Model D5606A.
Note 2. Use with Model D5609A.

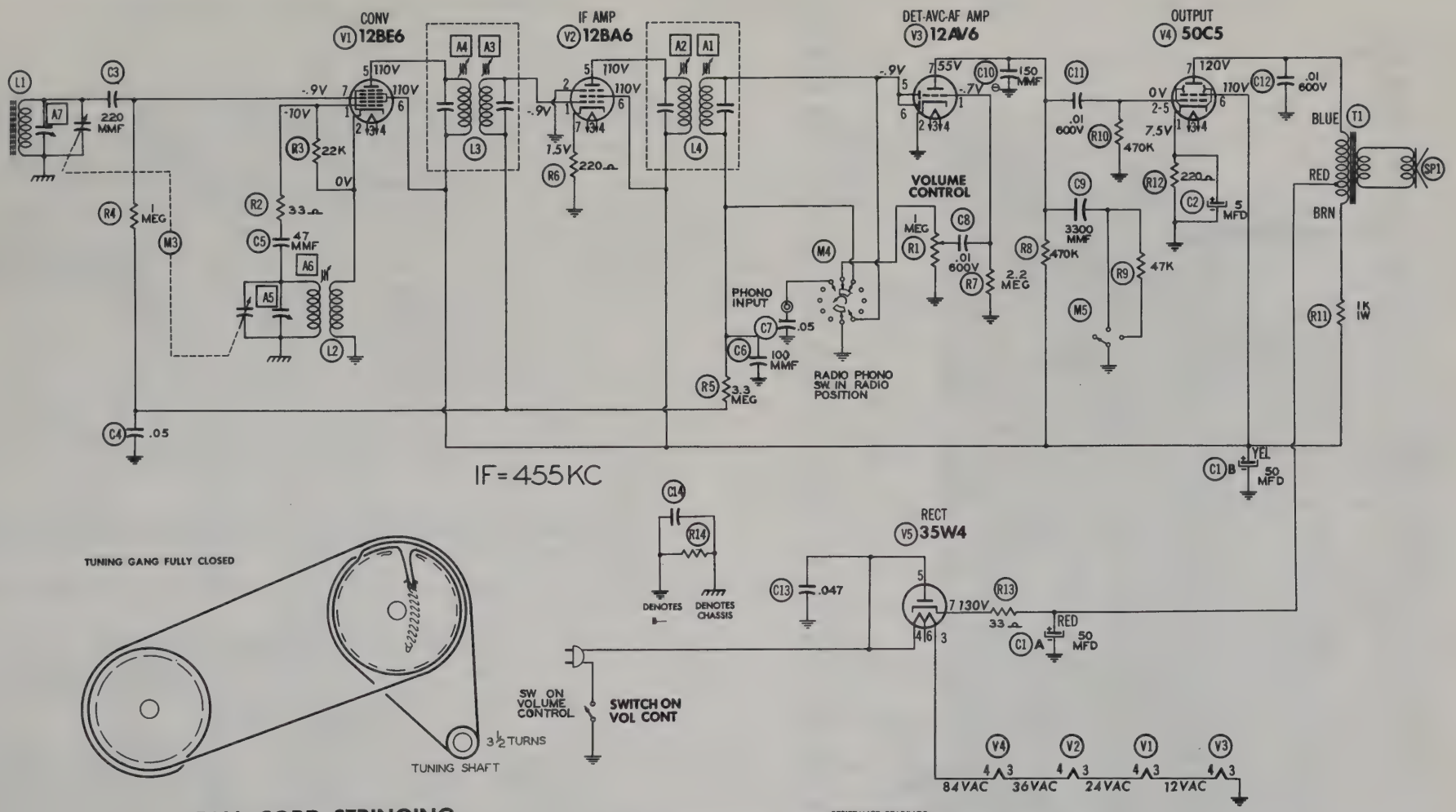
MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M3	Tuning Cap.	GC-16	2 Gang (28-385MMF, 28-175MMF)
M4	Switch	SW-1	Radio-phono (DPDT Rotary - wafer type) (Part No. SW-20 in Model D5606A)
M5	Switch	SW-2	Tone (3P-3 position rotary-wafer type) (Part No. SW-21 in Model D5606A)

CHASSIS—BOTTOM VIEW



TRUETONE MODEL D5606A



DIAL CORD STRINGING

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.7Ω	12Ω	24Ω	†1KΩ	†1KΩ	5.3Meg
V 2	12BA6	4.3Meg	0Ω	24Ω	36Ω	†1KΩ	†1KΩ	220Ω
V 3	12AV6	2.2Meg	0Ω	0Ω	12Ω	1Meg	1Meg	†471KΩ
V 4	50C5	220Ω	470KΩ	36Ω	86Ω	470KΩ	†1KΩ	†250Ω
V 5	35W4	TP	NC	86Ω	121Ω	121Ω	115Ω	100KΩ

ALL MEASUREMENTS TAKEN IN RADIO POSITION WITH PHONO MOTOR DISCONNECTED.
† MEASURED FROM PIN 7 OF V5.
TP - TIE POINT
NC - NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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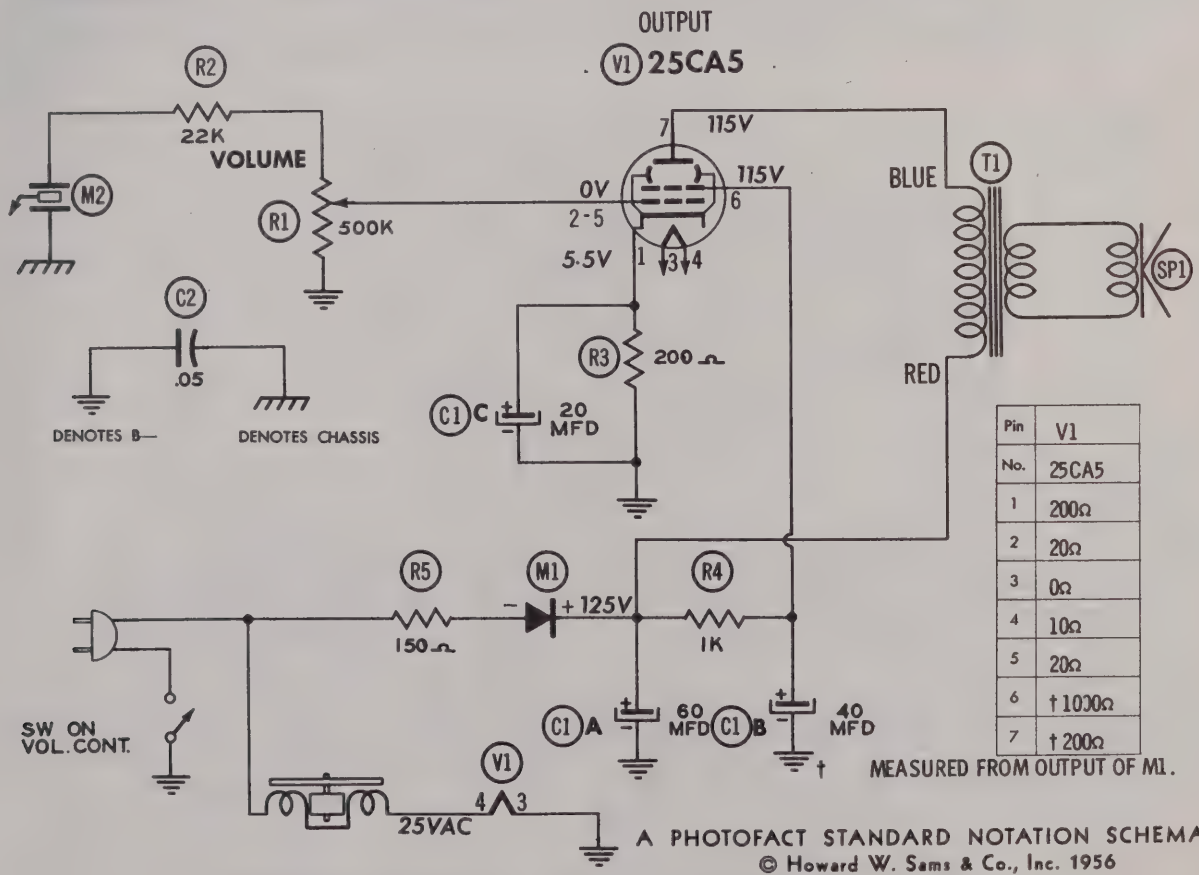
ULTRATONE MODEL 110

ULTRATONE MODEL 110

TRADE NAME	Ultratone Model 110
MANUFACTURER	Audio Industries, Michigan City, Indiana
TYPE SET	AC Operated Phono Amplifier With 3 Speed Manual Record Player
TUBES (One)	Type 25CA5
POWER SUPPLY	110-120 Volts AC - 60 Cycles RATING .33 Amp. @ 117 Volts AC

ULTRATONE MODEL 110



Pin No.	V1 25CA5
1	200Ω
2	20Ω
3	0Ω
4	10Ω
5	20Ω
6	† 1030Ω
7	† 200Ω

MEASURED FROM OUTPUT OF M1.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Output	25CA5	

ITEM No.	USE	TYPE	NOTES

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Ultratone PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	150		PRS150V/ 804020	BBRT84215	TCT3117	TDLT-7	FMT-333	TVA-3435
B	40	150							
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Ultratone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Ultratone PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½		AB-60	A47-500K-2		U-48	Volume
B	Shaft			AK-4	KSS-3		Not Req.	Attach to R1A
C	Switch			KB-1	SWE-12		US-26T	Attach to R1A

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Ultratone PART No.	IRC PART No.	
R2	22K			BTS-22K	
R3	200Ω			BTS-200	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Ultratone PART No.	IRC PART No.	
R4	1000Ω			BTS-1000	
R5	150Ω			BTS-150	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Ultratone PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3.8K	3.8Ω	Part of spkr.	21101	A-3025	A-3332	26S58 ①	S-12X	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Ultratone PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3.8Ω		4A07	223S1	

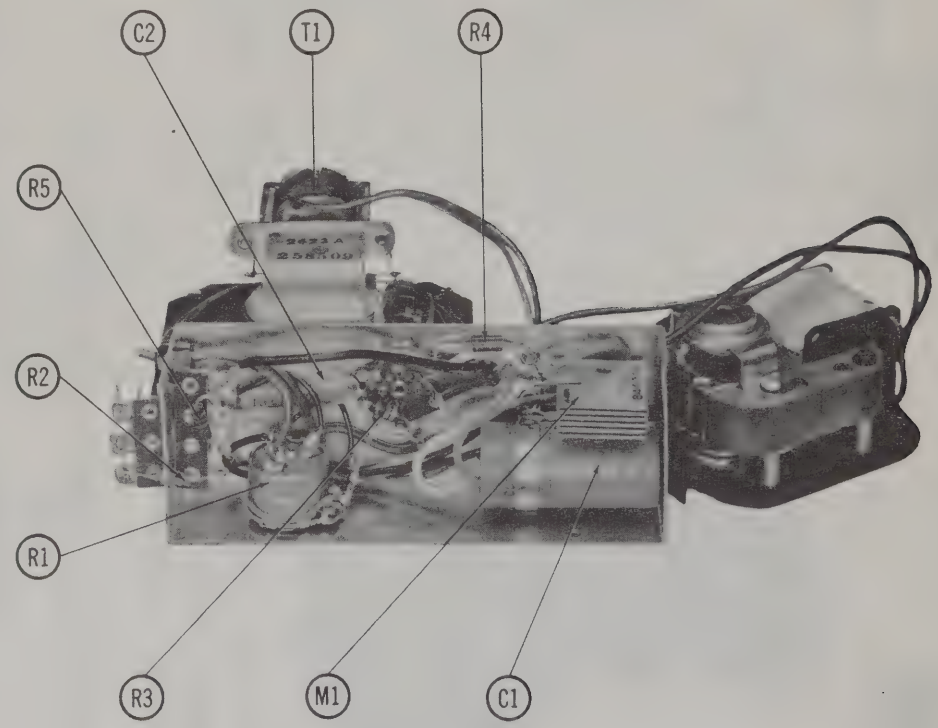
SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Ultratone PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.028A		1263A	RS-050	6S65	8J1	65	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	Ultratone PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2		106 *P-106		*2460		* Complete tone arm and cartridge assembly.

CHASSIS—BOTTOM VIEW



PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

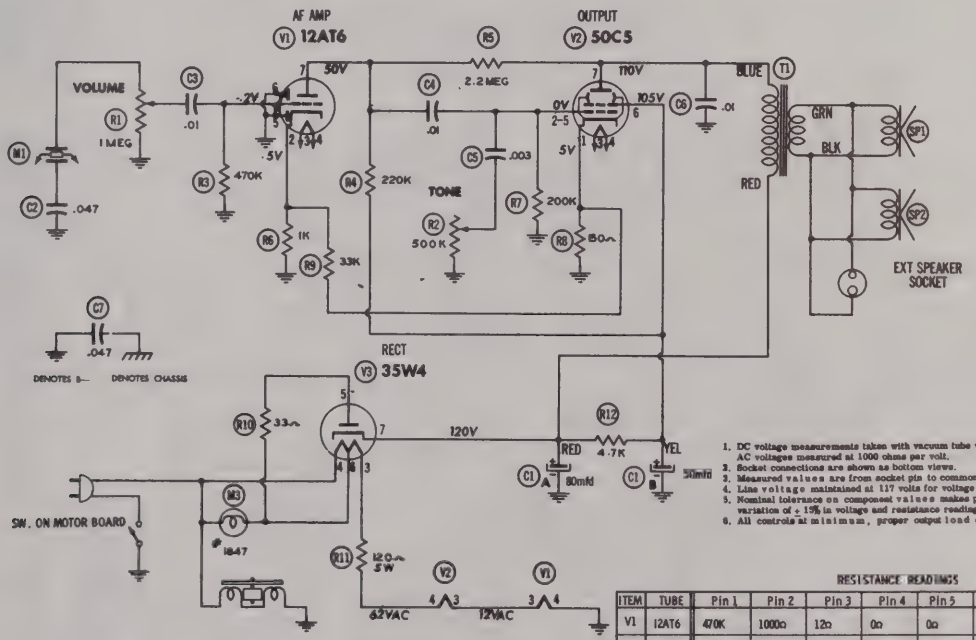
ITEM No.	REPLACEMENT DATA				REMARKS
	Ultratone PART No.	FIDELITONE PART No.	JENSEN PART No.	WALCO PART No.	
M3			*W-122		* Metal

V-M
MODELS 1285-B, -M

V-M
MODELS 1285-B, -M

TRADE NAME	V-M Models 1285-B, 1285-M
MANUFACTURER	V-M Corp., Benton Harbor, Michigan
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES (Three)	Types 12AT6 AF Amplifier, 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .22 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE V-M MODEL 1200 - PHOTOFACT SET 290 — FOLDER 11 OR RECORD CHANGER MANUAL CM-7.



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AT6	470K	1000Ω	12Ω	0Ω	0Ω	0Ω	†225K
V2	50C5	150Ω	200K	12Ω	62Ω	200K	†4700Ω	†210Ω
V3	35W4	NC	NC	182Ω	205Ω	233Ω	200Ω	20K

† MEASURED FROM PIN 7 OF V3.
NC NO CONNECTION.

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335-17

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AT6	
V2	Output	50C5	
V3	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	V-M PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	150	12055	PRS150V4080	BBRD8415	TCD498	TDLD-12	FMT-1540	TVA-3455
B	50	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	V-M PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	400	12009	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C3	.01	400	12003	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C4	.01	400	12003	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C5	.003	600	12004	S13000	D6-302	CUB6D3	GP2-333-302	PT623	6TM-D3	
C6	.01	400	12003	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C7	.047	400	12009	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	V-M PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	11993	AB-70	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
R2A	500K	½	11997	AB-60	A47-500K-Z	Q13-133	U-48	Tone
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	V-M PART No.	IRC PART No.	
R3	470K		11373	BTS-470K	
R4	220K		11293	BTS-220K	
R5	2.2Meg		11533	BTS-2.2Meg	
R6	1000Ω		10733	BTS-1000	
R7	220K		11293	BTS-220K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	V-M PART No.	IRC PART No.	
R8	150Ω		10533	BTS-150Ω	
R9	33K		11093	BTS-33K	
R10	33Ω		10373	BTS-33	
R11	120Ω	5	11953	1 3/4A-125	
R12	4700Ω		10893	BTS-4700	

SPEAKER

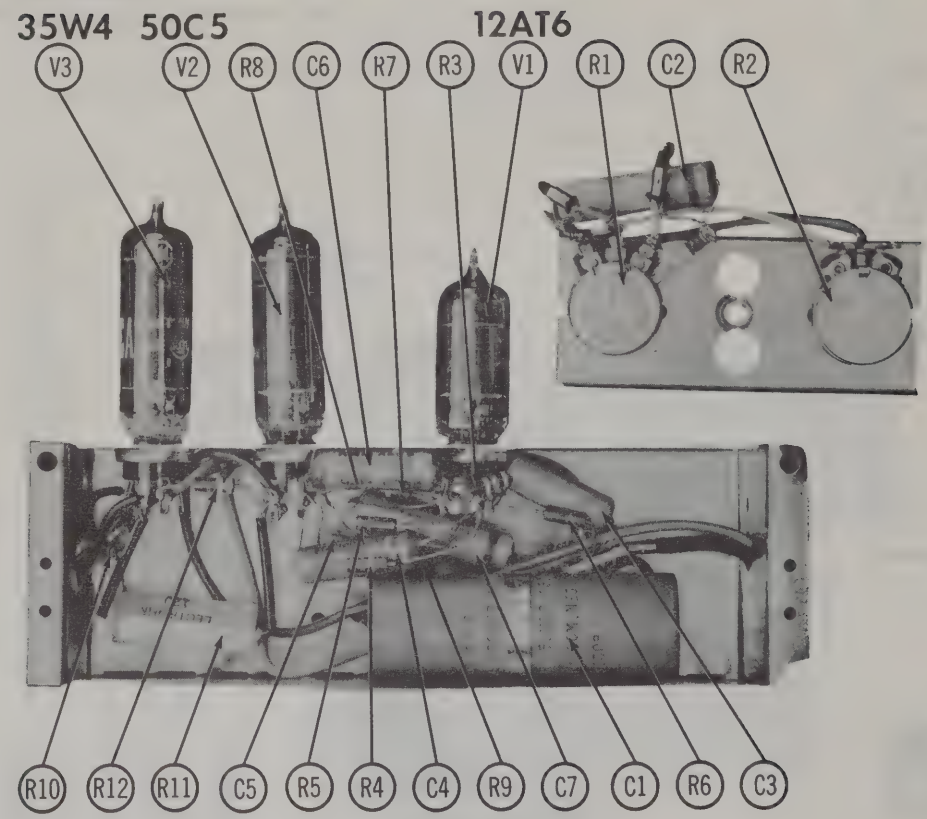
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	V-M PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5"	PM	6Ω	9237-2	5A1Z6		
SP2	5"	PM	6.1Ω	9262-2	5A1Z6		

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	V-M PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	9121	112-TS	A-1 & A-3	46T	0-1 or S-1 & 0-3	

ASTATIC AND ELECTRO- VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

CHASSIS—BOTTOM VIEW



PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	V-M PART No.	FIDELITONE PART No.	JENSEN PART No.	WALCO PART No.	
M2		†C-143 or •C-143D	†CR-55 or •CR-55D	†W-64S	78RPM Needle
		†A-142 or •A-142D	†CR-55LP or •CR-55LPD	†W-64MGS	16 2/3, 33 1/3 and 45RPM Needle

MISCELLANEOUS

ITEM No.	PART NAME	V-M PART No.	NOTES
M3	Pilot Light	7791	#1847
	Cabinet	9223B	Model 1285-B
	Cabinet	9223M	Model 1285-M
	Knob	9238	Volume & tone
	Lucite Rod	9239	Lazy Light

ZENITH MODELS
Y513F, G, R, W (Ch. 5Y01)

ZENITH MODELS
Y513F, G, R, W (Ch. 5Y01)

TRADE NAME	Zenith Models Y513F, Y513G, Y513R, Y513W (Ch. 5Y01)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Avenue, Chicago 39, Illinois
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC — RATING .27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.5MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ mod.)	600KC	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amplifier	12AT6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■80	150	22-2710	AFH2-19	XB004	FP216	TMD-16	D-085	R1534 *
B	▲40	150							

* Non Catalog Item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.05	200	22-829	BPD-05	DF-503	CUB2S5	-	PT415	2TM-S5	
C3	100		22-5	NPO-D1100	TCZ-100	TZ30	NPO-337-101	ZT-531	5TCC-T1	
C4	3300		22-11	BPD-0033	D6-332	K077	811-0033	UC-5233	5HK-D33	
C5	.1	200	22-2084	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C6	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C7	470		22-6	BPD-00047	DD-471	K060	811-471	UC-5347	5GA-T47	
C8	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C9	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C10	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	
C11	10000		22-3	BPD-01	DD-103	K082	811-01	DC511	5HK-S1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1.5Meg	½	63-3601					Volume & Switch (Tapped @ 600K)
R2A	1Meg	½	63-3640	AB-70	A47-1Meg-Z	Q13-137	U53	Tone
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ZENITH PART No.	IRC PART No.	
R3	22K		63-1842	BTS-22K	
R4	2.2Meg		63-1926	BTS-2.2Meg	
R5	68Ω		63-1737	BTS-68	
R6	47K		63-1856	BTS-47K	
R7	470K		63-1898	BTS-470K	
R8	100K		63-1870	BTS-100K	
R9	22K		63-1842	BTS-22K	
R10	1800Ω		63-1796	BTS-1800	
R11	4.7Meg		63-1940	BTS-4.7Meg	
R12	470K		63-1898	BTS-470K	
R13	470K		63-1898	BTS-470K	
R14	150Ω		63-1750	BTS-150	
R15	2200Ω		63-1800	BTS-2200	
R16	1000Ω	1	63-1574	BTA-1000	

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.3K	3-4Ω	95-1457	Z1001①	A-2928 ①	A-3876①	22S46 ①	S-1X ①	① Use original channel

SPEAKER

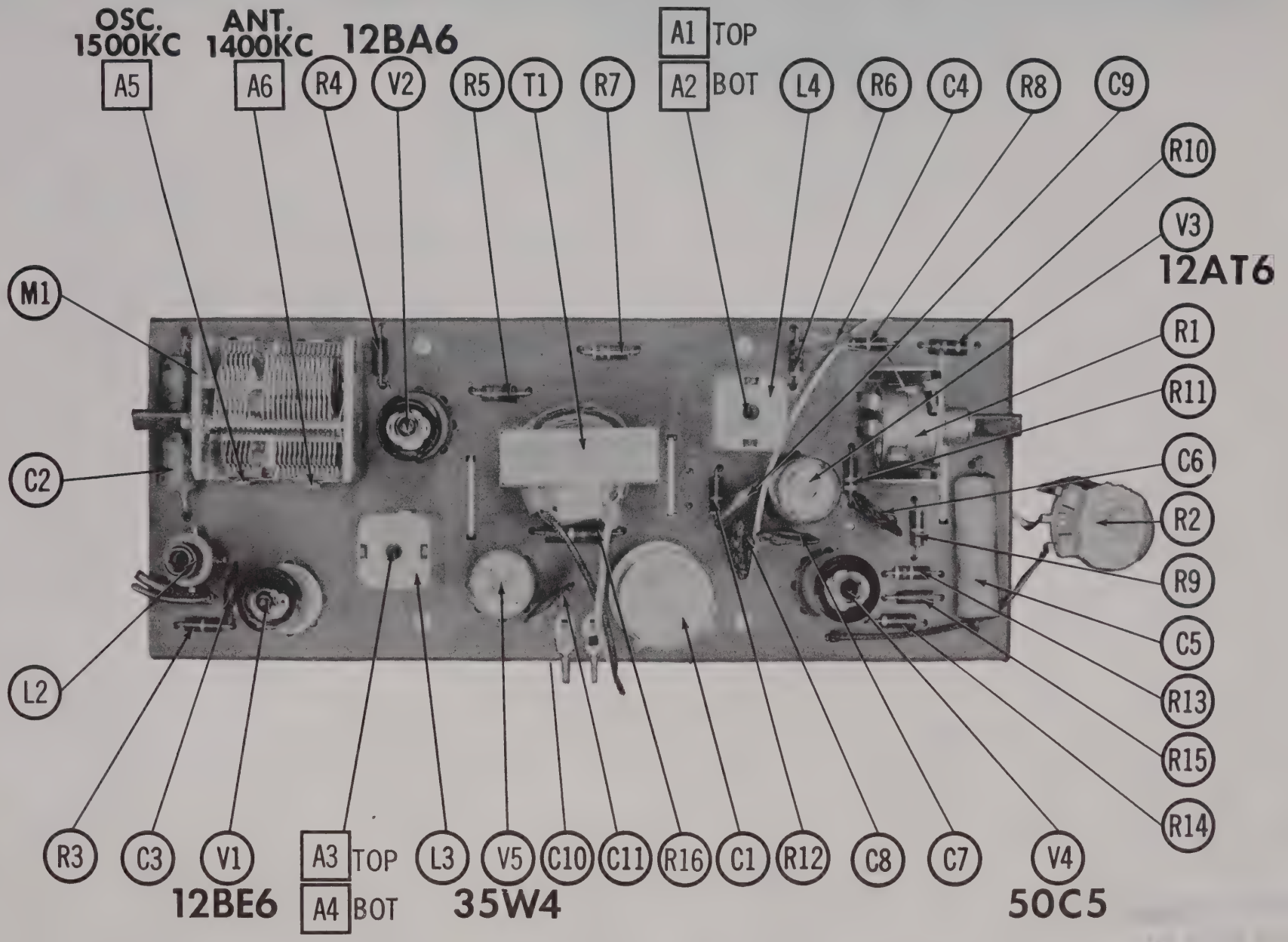
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	QUAM PART No.	RCA TYPE No.	
SP1	6" x 9"	PM	3-4Ω	49-787	69A2	238S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.2Ω		S-23663				
L2	Osc. Coil	.6Ω	6.5Ω	S-23656				
L3	Input IF	19Ω	19Ω	95-1501	16-6780		13-PC1	
L4	Output IF	19Ω	19Ω	95-1502				

MISCELLANEOUS

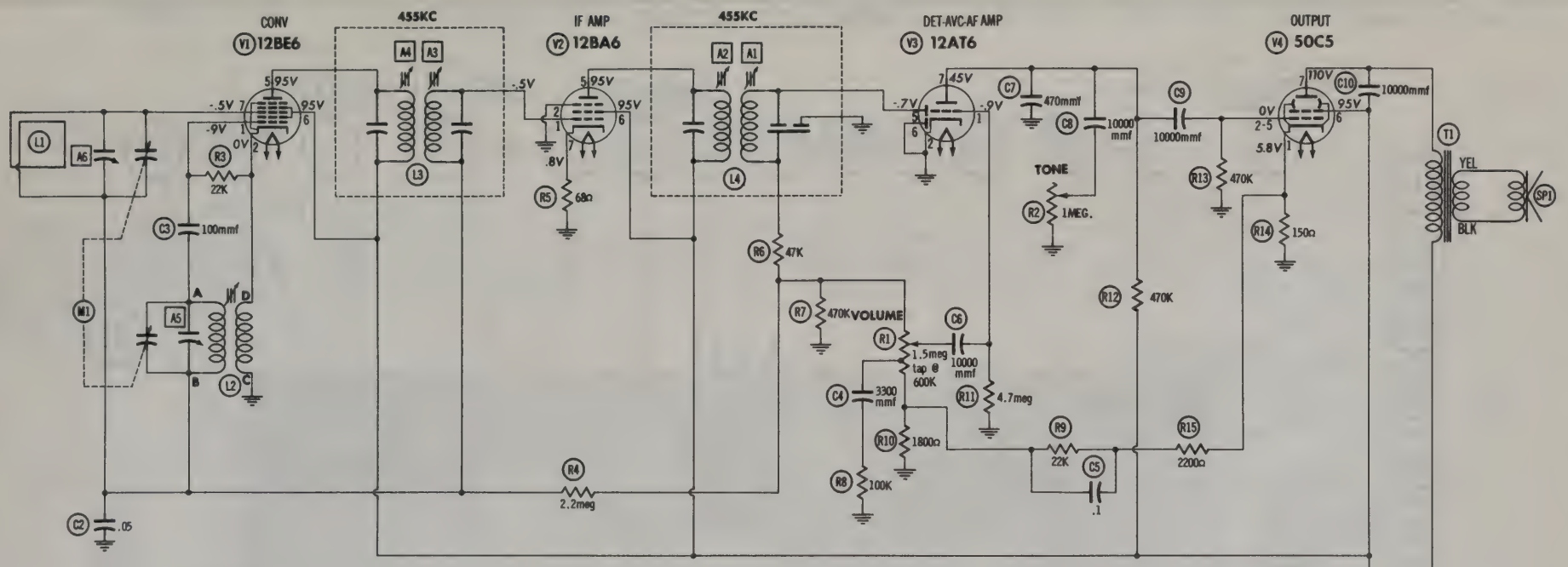
ITEM No.	PART NAME	ZENITH PART No.	NOTES
M1	Tuning Cap.	22-2717	2 Gang
	Cabinet	S-23669	Includes escutcheon assy. - Model Y513F
	Cabinet	S-23670	Includes escutcheon assy. - Model Y513G
	Cabinet	S-23672	Includes escutcheon assy. - Model Y513R
	Handle	36-115	Model Y513F
	Handle	36-118	Model Y513G
	Handle	36-120	Model Y513R
	Knob	46-901	Tone - Model Y513R
	Knob	46-1453	Tone - Model Y513F
	Knob	46-1500	Tone - Model Y513G
	Knob	46-1427 or 46-1505	Dial - Model Y513F
	Knob	46-1428 or 46-1506	Dial - Model Y513G
	Knob	46-1430 or 46-1507	Dial - Model Y513R
	Knob	46-1445 or 46-1509	On-off-volume & tuning - Model Y513F
	Knob	46-1446 or 46-1510	On-off-volume & tuning - Model Y513G
	Knob	46-1448 or 46-1511	On-off-volume & tuning - Model Y513R



CHASSIS TOP VIEW

ZENITH
MODEL Y513F (Ch. 5Y01)

SET 335 FOLDER 18



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.6Ω	96Ω	84Ω	†1000Ω	†1000Ω	2.8Meg
V2	12BA6	2.8Meg	0Ω	84Ω	72Ω	†1000Ω	†1000Ω	68Ω
V3	12AT6	4.7Meg	0Ω	0Ω	12Ω	450K	0Ω	†470K
V4	50C5	150Ω	470K	72Ω	12Ω	470K	†1000Ω	†185Ω
V5	35W4	NC	NC	96Ω	120Ω	120Ω	117Ω	25K

† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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ZENITH MODEL Y2222Y (Ch. 17Y20)

TRADE NAME	Zenith	MODELS	CHASSIS
		Y2220R, RU, Y2222C, CU, E, EU, R, RU, Y, YU	17Y20, U
		Y2232E, EU, R, RU, Y2247E , EU, R, RU, Y2250, E, EU, R, RU, U, Y2258E, EU, H, HU, R, RU, Y2281E, EU, R, RU	17Y22, U
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois		
TYPE SET	Television Receiver		
TUBES	Seventeen		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.61 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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ZENITH MODELS Y2220R, RU, U, Y2222C, CU, E, EU, Y, YU, U, Y2232E, EU, R, RU, Y2247E, EU, R, RU, Y2250, E, EU, R, RU, U, Y2258E, EU, H, HU, R, RU, U, Y2281E, EU, R, RU, U (Ch. 17Y20, U, 17Y22, U)

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MODEL	CHASSIS
Y2222Y.....	17Y20

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 8 metal screws. Remove rear cover.

2. Disconnect speaker leads.

3. Remove 2 metal screws at the top (AGC control) bracket and 2 metal screws at the bottom (AC interlock) bracket, also 1 metal screw at bottom right corner of chassis.

4. Slide entire unit (chassis, picture tube and safety glass) from front of cabinet.

5. Remove 2 speaker nuts. Remove speaker.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 2 metal screws holding name plate at bottom of cabinet. Remove plate tilt glass out at bottom and remove. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjust the horizontal hold located on the front of the set until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control (R7) located on the rear of the chassis for maximum volume and MINIMUM buzz.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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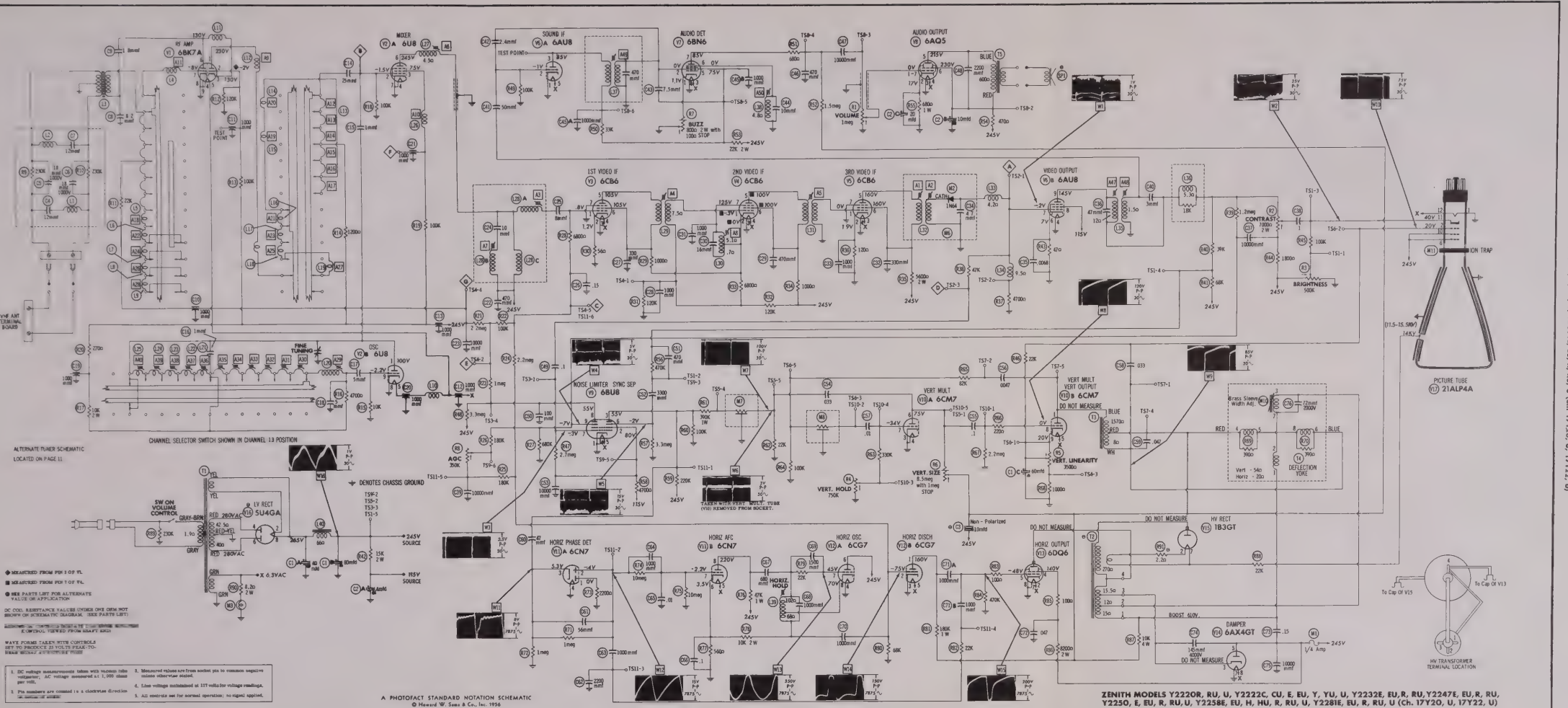

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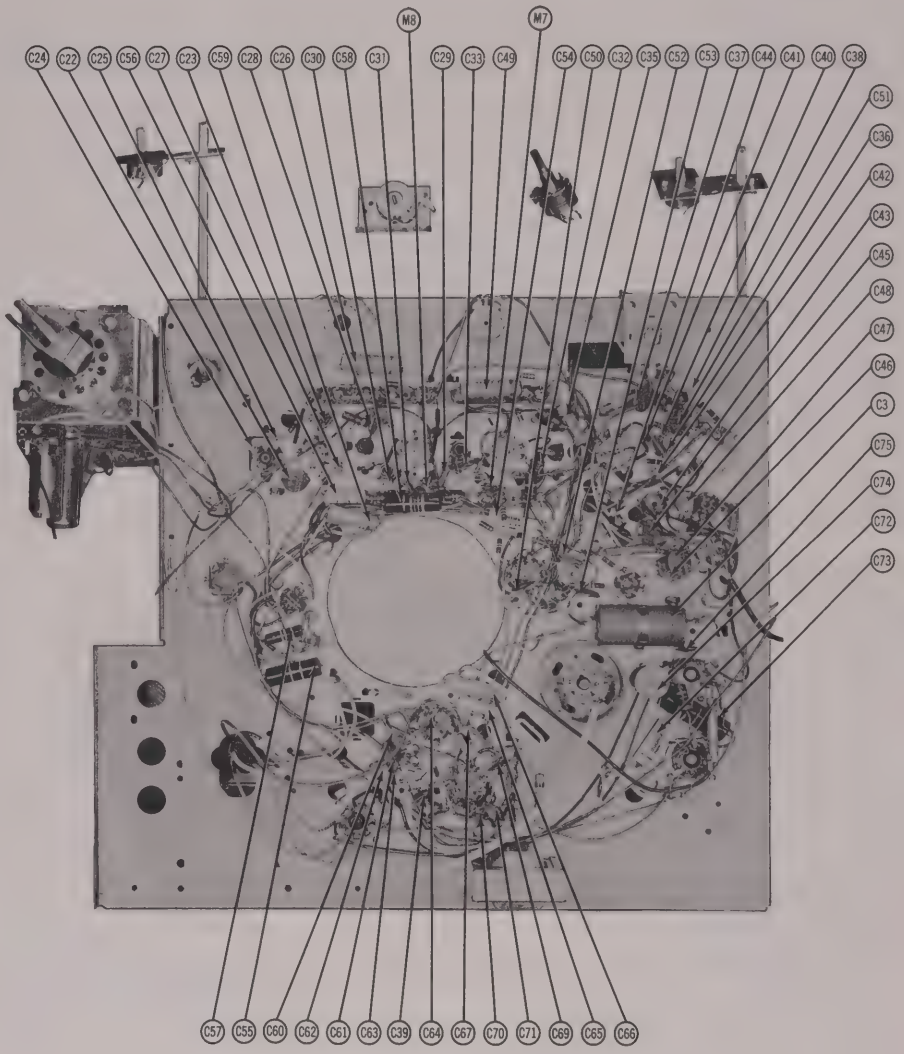
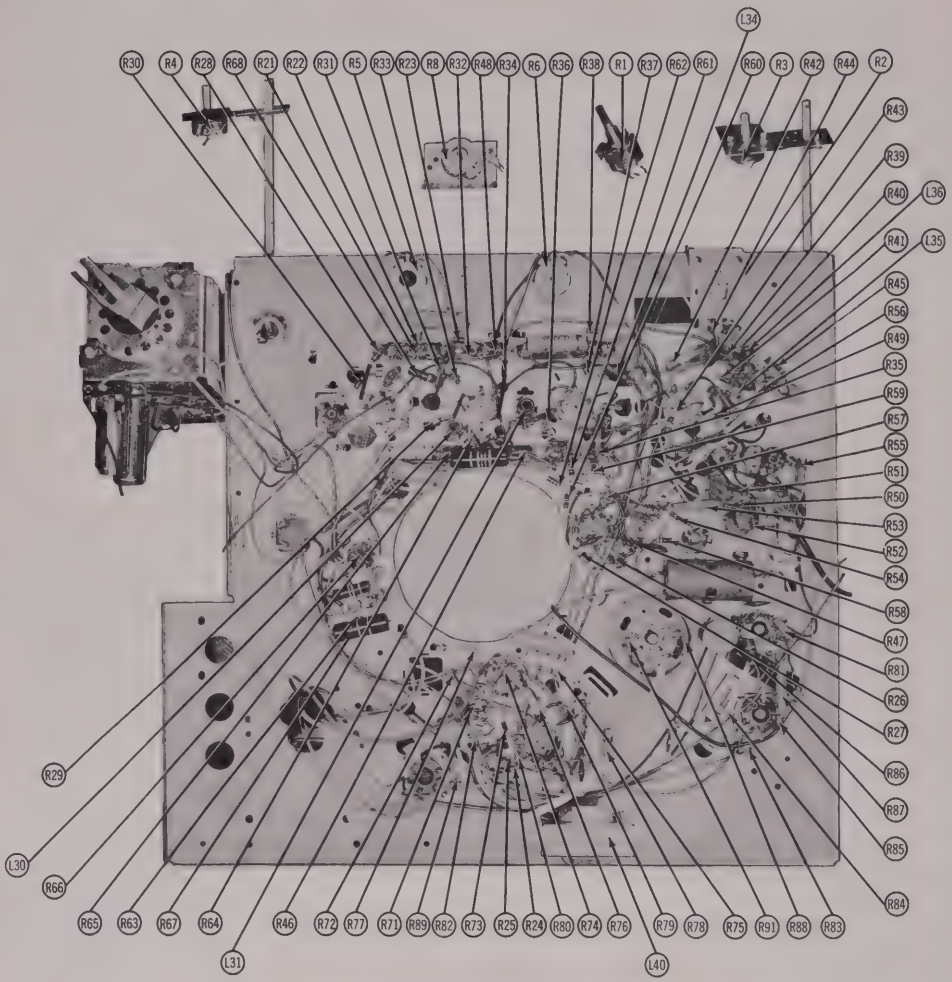
ZENITH MODELS Y2220R, RU, U, Y2222C, CU, E, EU, Y, YU, U, Y2232E, EU, R, RU, Y2247E, EU, R, RU, Y2250, E, EU, R, RU, U, Y2258E, EU, H, HU, R, RU, U, Y2281E, EU, R, RU, U (Ch. 17Y20, U, 17Y22, U)



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

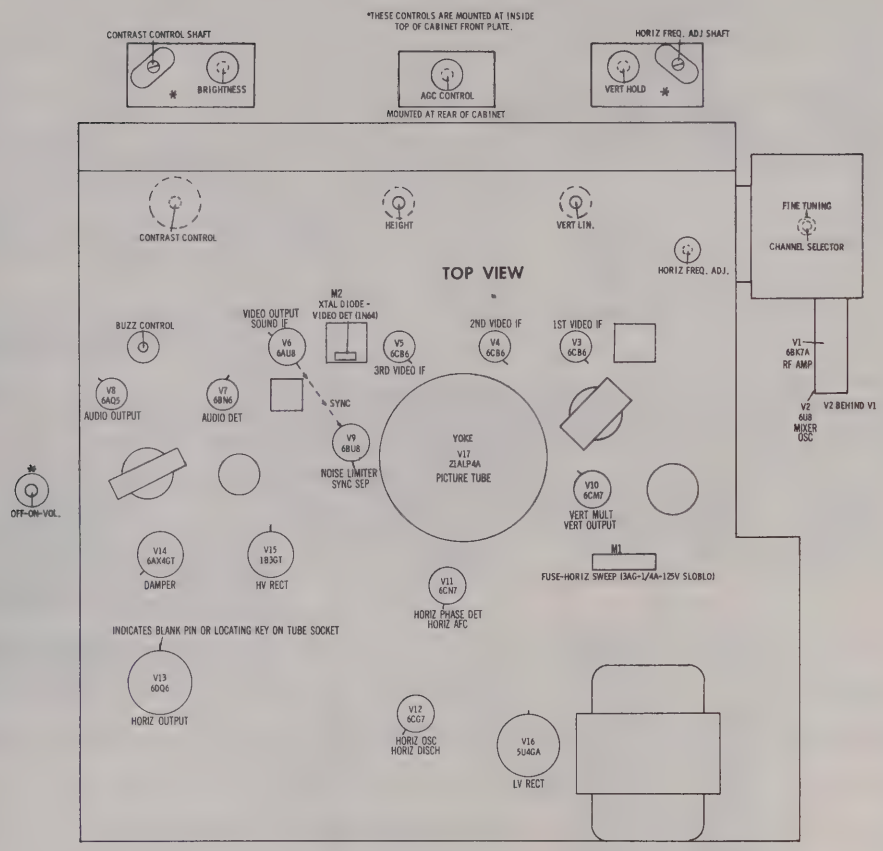
ZENITH MODELS Y2220R, RU, U, Y2222C, CU, E, EU, Y, YU, U,
Y2232E, EU,R, RU, Y2247E, EU, R, RU, Y2230, E, EU, R, RU, U, Y2326E,
EU, H, HU, R, RU, U, Y2281E, EU, R, RU, U (Ch. 17Y20, U, 17Y22, U)



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

ZENITH MODELS Y2230R, RU, U, Y2223C, CU, E, EU, Y, YU, U,
Y2233E, EU,R, RU, Y2347Z, EU, R, RU, Y2230, E, EU, R, RU, U, Y2328E,
EU, M, MU, R, MU, U, Y2281E, EU, R, RU, U (Ch. 17Y30, U, 17Y32, U)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V16

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V17
Has pic, no sound - V6, V7, V8

SYNC FAILURE
No vert. sync - V9, V10
No horiz. sync - V9, V11, V12
No vert. or horiz. sync - V9

SWEEP FAILURE
No raster, has sound - V12, V13, V14, V15, V17, Fuse (M1)
No vertical deflection - V10
Poor vert. linearity or foldover - V10
Poor horiz. linearity or foldover - V12, V13, V14
Narrow picture - V12, V13, V14, V15, V16
Vert. off freq. - V9, V10
Horiz. off freq. - V9, V11, V12

ZENITH MODELS Y2220R, RU, U, Y2222C, CU, E, EU, Y, YU, U, Y2232E, EU, R, RU, Y2247E, EU, R, RU, Y2250, E, EU, R, RU, U, Y2258E, EU, H, HU, R, RU, U, Y2281E, EU, R, RU, U (Ch. 17Y20, U, 17Y22, U)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

If the set is aligned with the picture tube removed, the high voltage lead should be securely taped away from the chassis.

VIDEO IF ALIGNMENT

Remove the mixer-oscillator tube (V1) from its socket and connect a wire to pin 8. Replace V1 in its socket and connect a clip lead from the loose end of the wire to chassis. Connect the negative lead of a 6 volt bias supply to point Ⓒ. Positive to chassis. Connect a clip lead from point Ⓕ to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470HMS	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC	A37	Vert. amp. thru 10K to point Ⓐ. Low side to chassis.	A1, A3	Adjust for response similar to Fig. 1. If correct response cannot be obtained, check to see if slugs are entering coils from the outside ends of the coils.
2.	"	High side to point B . Low side to chassis.	"	41.25MC 42.75MC 45.0MC 45.75MC 47.25MC	"	"	A3, A4, A5, A6, A7	Adjust for response curve similar to Fig. 2 with markers placed as indicated. Readjustment of A1 and A3 should not be required to obtain proper response.
3.	"	"	"	40.5MC	"	"	A8	Remove bias battery and connect clip lead from bias point to chassis. Adjust A8 for maximum displacement of 40.5MC marker but not to exceed 41.25MC marker. (See Fig. 3).

VHF RF AND MIXER ALIGNMENT FOR TUNER 82-4386

Connect the negative lead of a 3 volt bias supply to point Ⓕ. Positive to chassis. Pre-set A26 at its center adjustment position.
In step 1 adjustment A20 is not necessary if proper bandpass is obtainable by adjusting A19.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Fig. 4	Across antenna terminals thru matching network. (Fig. 4)	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. thru 10K to point Ⓐ. Low side to chassis.	A9, A10, A11	Check for response curve similar to Fig. 5. If necessary, adjust A10 by expanding or compressing coil turns for proper bandwidth. Adjust A11 by expanding or compressing coil turns for maximum amplitude of response curve.
5.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"	A12	Check for response curve similar to Fig. 5. If necessary, adjust by bending loop in or out from switch rotor for proper response.
6.	"	"	201MC (10MC Swp)	199.25MC 203.75MC	11	"	A13	"
7.	"	"	195MC (10MC Swp)	193.25MC 197.75MC	10	"	A14	"
8.	"	"	189MC (10MC Swp)	187.25MC 191.75MC	9	"	A15	"
9.	"	"	183MC (10MC Swp)	181.25MC 185.75MC	8	"	A16	"
10.	"	"	177MC (10MC Swp)	175.25MC 179.75MC	7	"	A17	"
11.	"	"	88MC (10MC Swp)	85.25MC 67.75MC	6	"	A18, A19, A30	Adjust A19 and A30 for correct bandpass. Adjust A18 for maximum amplitude similar to Fig. 5. A18, A19 and A30 are adjusted by expanding or compressing coil turns.
12.	"	"	78MC (10MC Swp)	77.25MC 81.75MC	5	"	A31, A32	Adjust by expanding or compressing coil turns for response wave similar to Fig. 5.
13.	"	"	68MC (10MC Swp)	67.25MC 71.25MC	4	"	A33, A34	"
14.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	A35, A36	"
15.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	A37, A38	"

VHF OSCILLATOR ALIGNMENT FOR TUNER 82-4392

Connect the bias as under "Video IF Alignment". Turn the fine tuning control until the small hole in the fine tuning cam is directly over the small hole just below the channel 13 adjustment screw.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Fig. 4	Across antenna terminals wthru matching network. (Fig. 4)	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. thru 10K to point Ⓐ. Low side to chassis.	A39	Adjust to place video marker at 50% on response curve as shown in Fig. 6. Sound marker should be at 5%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A30	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A31	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A33	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A33	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A34	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A35	
			88MC (10MC Swp)	85.25MC 87.75MC	6		A36	
			78MC (10MC Swp)	77.25MC 81.75MC	5		A37	
			68MC (10MC Swp)	67.25MC 71.75MC	4		A38	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A39	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A40	

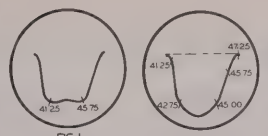


FIG. 1

FIG. 2

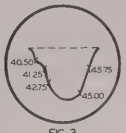
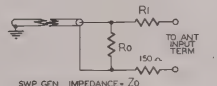


FIG 3



Z0	R0	R1
50	50	120
75	82	10
92	110	100

FIG. 4

FIG. 5

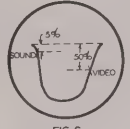
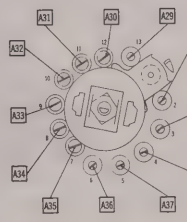


FIG. 6



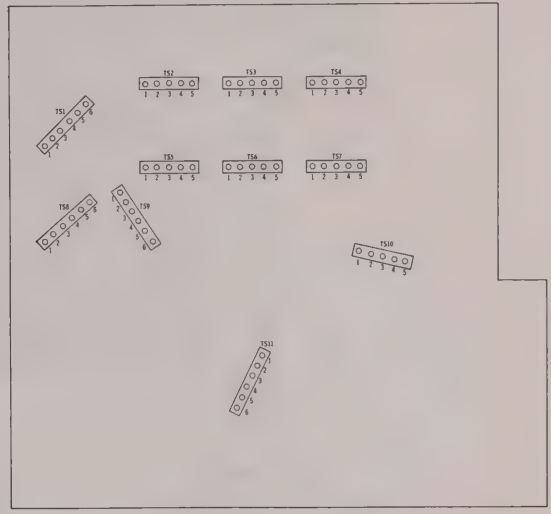
UHF TUNER ALIGNMENT

Alignment of the UHF tuner should not be attempted without the proper test equipment.
Switch the receiver to the UHF position. Connect the negative lead of a 3 volt bias supply to point Ⓕ. Connect the positive lead to chassis. Adjust the sweep generator to provide 3 volts peak to peak on the scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω carbon resistors	Across UHF antenna terminals with 120Ω in each lead.	713MC (10MC Swp)	711.25MC	84	Vert. amp. thru 10K to point Ⓐ. Low side to chassis.	A41, A42, A43	Adjust for response similar to Fig. 5. When adjusting the oscillator adjustment (A41), two responses may be found, the correct setting is with the adjustment in the most counter clockwise position.
8.	"	"	473MC (10MC Swp)	471.25MC	14	"		Check for response similar to Fig. 5. If the oscillator is off calibration more than 3 channels, adjust the oscillator travel adjustment (oscillator, mixer and ant. travel adjustments are the round thumb screws on top of the tuner) to scale. Care must be exercised when making this adjustment so as not to move the rocker arm out of its bearing. Adjust the mixer and antenna travel adjustments for maximum amplitude of response.
9.	"	"	887MC (10MC Swp)	185.25MC	84	"	A44, A45, A46	Adjust A44 to place marker at 80% as in Fig. 6. Adjust A45 and A46 for maximum amplitude of response.

SOUND IF ALIGNMENT

Connect an attenuator (Zenith part 49-17303 or equivalent) in series with the receiver antenna.
Tune in a modulated TV signal and adjust the attenuator until the signal falls below the limiting level of the 6BN6 (limiter detector), as evidenced by bias in the sound similar to super regeneration.
Adjust the sound takeoff transformer (A47 and A48), the sound IF transformer (A49) and the quadrature coil (A50) for maximum sound of maximum quality. Adjust the bias control (R7) for minimum intercarrier buzz.
If during alignment of the sound IF the signal rises above the limiting level of the 6BN6 (bias disappears), increase attenuation until bias returns.



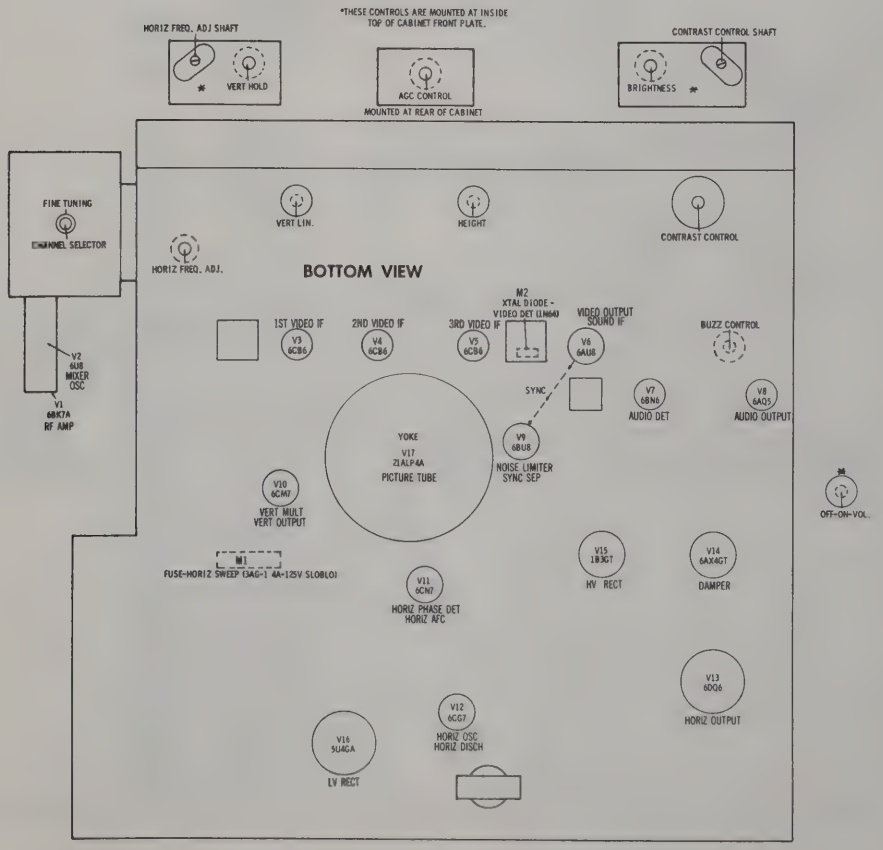
TERMINAL LOCATION CHART

ZENITH MODELS Y2320R, RU, U, Y2323C, CU, E, EU, Y, YU, U, Y2323E, EU, R, RU, Y2324E, EU, R, RU, Y2350, E, EU, R, RU, U, Y2398E, EU, H, HU, R, RU, U, Y2381E, EU, R, RU, U (Ch. 17Y3O, U, 17Y32, U)

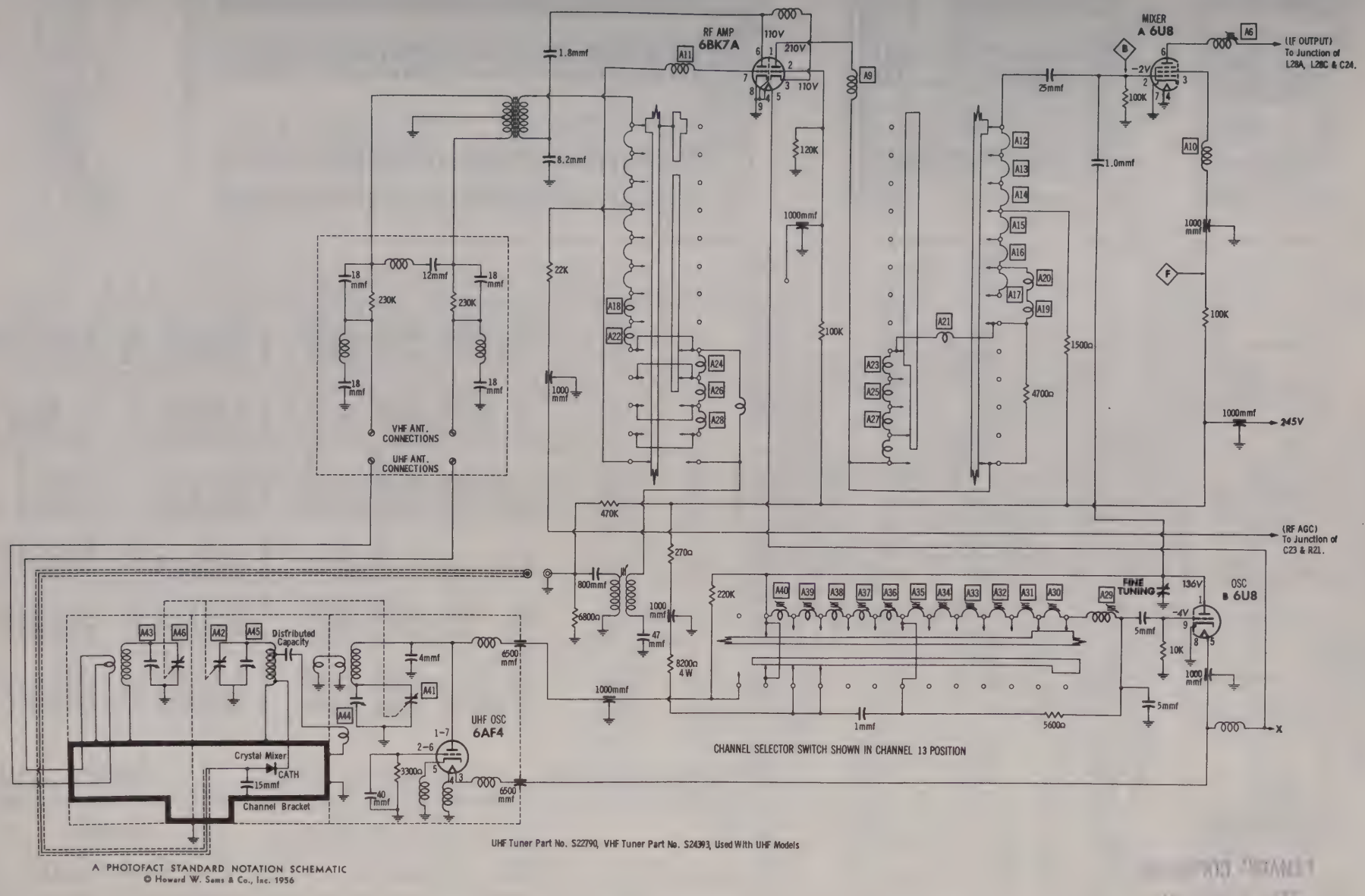
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BK7A	†1200Ω	60K	INF	0Ω	.1Ω	INF	3.5Meg	0Ω	0Ω
V2	6U8	†10K	100K	†100K	0Ω	.1Ω	†70Ω	0Ω	0Ω	10K
V3	6CB6	1.5Meg	56Ω	0Ω	.1Ω	▲1000Ω	▲1000Ω	0Ω		
V4	6CB6	60K	60K	0Ω	.1Ω	†1000Ω	†1000Ω	60K		
V5	6CB6	.1Ω	120Ω	.1Ω	0Ω	†5600Ω	†5600Ω	0Ω		
V6	6AU8	0Ω	100K	†55K	0Ω	.1Ω	47Ω	4700Ω	†15K	†800Ω
V7	6BN6	● 150Ω	.4Ω	.1Ω	0Ω	†22K	4.8Ω	▰ 1.5Meg		
V8	6AQ5	● 500K	680Ω	0Ω	.1Ω	†1000Ω	†550Ω	● 500K		
V9	6BU8	0Ω	†20K	†70K	0Ω	.1Ω	3.3Meg	2.7Meg	†1.5Meg	● 230K
V10	6CM7	▰ 11K	TP	0Ω	0Ω	.1Ω	●▰ 4Meg	● 650K	2.2Meg	● 1300Ω
V11	6CN7	2200Ω	850K	470K	0Ω	.1Ω	560Ω	5Meg	†47K	1.8Ω
V12	6CG7	▰ 180K	70K	0Ω	0Ω	.1Ω	†66Ω	32K	10K	NC
V13	6DQ6	TP	.1Ω	TP	†8300Ω	470K	TP	0Ω	0Ω	TOP CAP ▰ 15.5Ω
V14	6AX4GT	TP	NC	15Meg	NC	†66Ω	TP	0Ω	.1Ω	
V15	IB3GT	PINS	1 - 8	HAVE	INF	RESISTANCE				TOP CAP ▰ 285Ω
V16	5U4GA	NC	25K	TP	43Ω	NC	40Ω	TP	25K	
V17	21ALP4A	0Ω	23K	PIN 6 †66Ω	PIN 10 †66Ω	PIN 11 ●†150K	PIN 12 .1Ω			

† MEASURED FROM PIN 8 OF V16.
▲ MEASURED FROM PIN 7 OF V4.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
▰ MEASURED FROM PIN 3 OF V14.
TP TIE POINT
NC NO CONNECTION



TUBE PLACEMENT CHART



UHF Tuner Part No. S22790, VHF Tuner Part No. S24393, Used With UHF Models

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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ALTERNATE VHF-UHF TUNER SCHEMATIC

ZENITH MODELS Y2220R, RU, U, Y2222C, CU, E, EU, Y, YU, U, Y2232E, EU,R, RU, Y2247E, EU, R, RU, Y2250, E, EU, R, RU, U, Y2258E, EU, H, HU, R, RU, U, Y2281E, EU, R, RU, U (Ch. 17Y20, U, 17Y22, U)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amplifier	6BE7A	
V2	Mixer Oscillator	6U8	
V3	1st Video IF Amplifier	6CB6	
V4	2nd Video IF Amplifier	6CB6	
V5	3rd Video IF Amplifier	6CB6	
V6	Video Output-Sound IF Amplifier	6AU8	
V7	Audio Detector	6BH6	
V8	Audio Output	6AQ5	
V9	Noise Limiter-Sync Separator	6BU8	

ITEM No	USE	TYPE	NOTES
V10	Vert Whil.-Vert.Output	6CM7	
V11	Horiz. Phase Det.-Horiz Afc	6CN7	
V12	Horiz. Osc.-Horiz Discharge	6CQ7	
V13	Horiz Output	6DQ6	
V14	Damper	6AX4GT	
V15	HV Rectifier	1B3GT	
V16	LV Rectifier	5U4GA	Note 1

Note 1. 5U4GB may be used as an alternate.

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	ZENITH PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V17	21AL1P44Ⓐ 21ALP44	21AL1P44 Ⓐ 21AL1P44 Ⓐ Ⓑ 21ALP44	21AL1P44 Ⓐ 21AL1P44, B Ⓑ 21ALP44	21AL1P44 Ⓐ 21AL1P44, B Ⓑ 21ALP44	Ⓐ Aluminized Ⓑ Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING CAP.	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	ARBOVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	[illegible] PART No.
C1A	440	400	23-3743	AF124-57-56	C059	FP533.3	TMD-50 TD-50-50	D-355 FM-0550	R3355 *
B	480	400							
C	450	50							
C1A	4	350	23-3744	AF131-350	C06H	FP346.3	TMT-1U9	T-51U	TVL-3719
B	40	400							
C	30	25							
C2	10	400	23-3870 (Note D	PRS400VNP1	BR3045 † BR3046 †	† TC75 † TC75 †	† MT-4520 † MT-4530 †	[illegible]	

Note 1 C3 is a non-polarized unit.
† Compact negative leads together.
* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING CAP.	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	ARBOVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	15		23-3879		TCZ-12	TZ10	NP0K-120			
C5	18	1000	23-3880							
C6	18	1000	23-3881		TCZ-12	TZ10	NP0K-120			
C7	18		23-3878			Z016	NP0A-BR2			
C8	8.2		23-3681	NP6-DI8.2						
C9	1.8		23-3435							
C10	330		23-3733							
C11	1000		23-3877							
C12	1000		23-3732							
C13	330		23-3733							
C14	33		23-3871	N150-DI33	TCN-33	N033	N150K-330		5TCU-Q33	
C15	1		23-3720	NP0-BI	TCZ-1	T203	NP0A-010		5TCCB-V1	
C16	1		23-3714							
C17	5		23-3716							
C18	3		23-3718							
C19	1000		23-3733							
C20	1000		23-3733							
C21	1000		23-3733							
C23	470		23-6	RPD-00047	DD-471	KD60	811-471	UC-5347	5GA-T47	
C24	10000		23-3	RPD-01	DD-103	KD63	811-01	UC-5511	5HK-81	
C25	10		23-3731							
C26	8		23-3681	NP6-DI8.2		S015	NP0A-8R2		PT4015	2TM-P15
C27	18	200	23-3882	P3N2K-18					PT4018	2TM-P18
C31	330		23-3308	N330	D6-331	TP43	811-331	UC-5333	5GA-T33	
C32	1000		23-77	RPD-001	DD-103	KD69	811-001	UC-531	5HK-D1	
C33	470		23-3905	6N470	D6-471	KD60	GPSK-471	UC-5347	5GA-T47	
C34	16		23-3296							
C35	1000		23-77	RPD-001	DD-105	KD69	801-001	DC-581	5HK-D1	
C36	330		23-3308	N330	D6-331	TP43	GPSK-331	UC-5333	5GA-T33	
C38	1000		23-77	RPD-001	DD-105	KD69	801-001	DC-581	5HK-D1	
C39	4.7		23-3867	NPO-S14.7	TCZ-4R7	T207	NP0A-4R7	ET-5547	5TCCB-V47	
C40	.0082	200	23-3819	NPO-S82	CUB4D68	GP3-333-S82	PT3268	ET-5568	5TM-D68	
C42	47		23-2467							
C47	10000		23-3	RPD-01	DD-103	KD63	811-01	DC-531	5HK-81	
C35	.1	200	23-1777	P3N2K-1	DF-104	CUB2P1			PT601	2TM-P1
C39	10000		23-3	RPD-01	DD-103	KD63	811-01	DC-531	5HK-81	
C40	82		23-3343	NPO-S82	TCS-S83	S007	MPG-S83-500	ET-5568	5TCCB-V33	
C41	80		23-3480	NPO-S280	TCZ-50	Z084	MPG-S38-500	ET-565	5TCC-Q5	
C43	2.4		23-3296							
C43	7.5		23-3742							
C44	14		23-3731							
C45A	1000		23-6	RPD-EK001	DD5-103	DKD69	613-001	DCD-531	5HK-KD1	
B	1000									
C46	470		23-6	RPD-00047	DD-471	KD60	811-471	UC-5347	5GA-T47	
C47	10000		23-3	RPD-01	DD-103	KD63	811-01	DC-531	5HK-81	
C48	3300		23-6	RPD-0033.	DD-332	KD72	811-0033	UC-5333	5GA-D33	
C49	.1	200	23-3780	P3N2K-1	DF-104	CUB2P1			PT601	2TM-P1
C50	100		23-6	RPD-001	DD5-161	D043	601-101	UC-531	5GA-T1	
C51	470		23-6	RPD-00047	DD-471	KD60	811-471	UC-5347	5GA-T47	
C52	3300		23-6	RPD-0033	DD-332	KD72	811-0033	UC-5333	5HK-D33	
C53	10000		23-3	RPD-01	DD-103	KD63	811-01	DC-531	5HK-81	
C54	.033	400	22-2633							
C55	.1	400	23-3061	P463M-1	DF-104	CUB4P1			PT601	4TM-P1
C56	.0047	600	23-1849	1464-0047		1RD47			MS-247	
C57	.01	400	22-2565							
C58	.033	600	22-2333							
C59	.047	200	23-3798	RPD-05	DF-503	CUB2D47			PT4747	2TM-S47
C60	.47	600	23-1883	RPD-1247	D6-479	2ER5Q47	831-470		ET-5447	MS-447
C61	56	500	23-1851	NPO-S156	D6-560	2ER5Q56	831-560		MS-456	
C62	3300		23-18	RPD-0033	DD-332	KD72	811-0033	UC-5333	5HK-D33	
C63	1000		23-17	RPD-01	DD-103	KD69	801-001	DC-531	5HK-D1	
C64	1000		23-17	RPD-01	DD-103	KD69	801-001	DC-531	5HK-D1	
C65	.01	300	23-1909	RPD-01	D6-103	CUB4E1	GP3-333-103	PT611	4TM-E1	
C66	.1	200	23-3780	P3N2K-1	DF-104	CUB2P1			PT601	2TM-P1
C67	680	500	23-2868	1464-00068	D6-681	1R5T68	811-681		MS-268	
C68	1000		23-3183	3464-01		1RE01	811-103	MCB385	MS-81	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No	RATING CAP.	RATING VOLT	REPLACEMENT DATA ZENITH PART No.	ARBOVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C69	1500		23-12	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C70	1000		23-17	BPD-01	DD-103	K069	801-001	DC-521	5HK-D1	
C71A	1000		23-21	3FD-EX001	DD5-102	DKD69	613-001	DCD-521	5HK-KD1	
B	1000									
C72	.047	400	23-1775	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C73	15	400	23-3821	P488N-15		CUB4P15		PT4015	4TM-P15	
C74	1.5	4000	23-3869							
C75	10000		23-3	BPD-01	DD-103	K063	811-01	DC-511	5HK-81	
C76	72	2000								

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	1	53-1624	B-70-S	A47-1Meg-S	QU-137	U54	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	Not Req.	SWE-11	76-1	UB-26	Attach to R1A
R2A	7000Ω	2	53-3284	W-138	A45-7500	W5K7500	B7500L	Contrast- Wire wound
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	D6-36	Attach to R2A
R3A	500K	1	53-3521	AB-51		QU7-123	PT533P	Brightness
B	Shaft		Not Req.	AK-4		Not Req.	Not Req.	Attach to R3A
R4A	750K	1	53-3532	AB-56	A47-750K-S	QU-136	TA16L	Vert. Hold
B	Shaft		Not Req.	AK-4	K26-3	Not Req.	Not Req.	Attach to R4A
R5A	3500Ω	1	53-3295	AB-9	A47-4000-S	QU-114	PTA352L	Vert. Linearity
B	Shaft		Not Req.	AK-19	K3-3	TQ	Not Req.	Attach to R5A
R6A	8.5Meg	1	53-3294	AAB-89	AA47-7.5Meg -S	QU-142	4PTA885L	Vert. Size
	with 1Meg stop					-8		
B	Shaft		Not Req.	AK-19	K3-3	TQ	Not Req.	Attach to R6A
R7	800Ω	3	53-3284		3B-800-50			Brass-100Ω stop- wire wound
R8A	350K	1	53-3825	AB-59	A47-500K-S	QU-132	TA56L	AGC
B	Shaft		Not Req.	AK-1	FSJ-1.4	Not Req.	Not Req.	Attach to R8A

* Connect 1.5Meg resistor in series with the right hand terminal of the control and the lead connecting to same terminal of the original control. (Control viewed from shaft end, terminals down).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	NOTES
R9	330Ω		53-3607	BTS-330Ω	
R10	230K		53-3607	BTS-230K	
R11	22K		53-1841	BTS-22K	
R13	120K		53-1873	BTS-120K	
R15	100K		53-1869	BTS-100K	
R14	10900		53-1799	BTS-10900	
R15	10K		53-1827	BTS-10K	
R16	4700Ω		53-1814	BTS-4700	
R17	10K	2	53-3176	BTS-10K	
R18	100K		53-1869	BTS-100K	
R19	100K		53-1869	BTS-100K	
R20	270Ω		53-1781	BTS-270	
R21	2.2Meg		53-1825	BTS-2.2Meg	
R22	100K		53-1869	BTS-100K	
R33	1Meg		53-1821	BTS-1Meg	
R24	2.2Meg		53-1825	BTS-2.2Meg	
R25	180K		53-1860	BTS-180K	
R26	180K		53-1860	BTS-180K	
R27	560K		53-1804	BTS-560K	
R28	68000		53-1851		
R29	1000Ω		53-1788	BTS-1000	
R30	56Ω		53-1733	BTS-56	
R31	120K		53-1873	BTS-120K	
R32	150K		53-1873	BTS-120K	
R33	68000		53-1851	BTS-6800	
R34	1000Ω		53-1788	BTS-1000	
R35	1400Ω	3	53-3233	BTS-1400	
R36	120Ω		53-1747	BTS-120	
R37	4700Ω		53-1813	BTS-4700	
R38	47K		53-1855	BTS-47K	
R39	1.2Meg		53-1915	BTS-1.2Meg	
R40	39K		53-1852	BTS-39K	
R41	68K		53-1863	BTS-68K	
R43	15K	2	53-1841	BTS-15K	
R43	47Ω		53-1729	BTS-47	
R44	1800Ω		53-1796	BTS-1800	
R45	100K		53-1870	BTS-100K	
R46	22K		53-1841	BTS-22K	
R47	2.7Meg		53-1828	BTS-2.7Meg	
R48	3.3Meg		53-1832	BTS-3.3Meg	
R49	100K		53-1869	BTS-100K	
R50	33K		53-1849	BTS-33K	

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA ZENITH PART No.	IRC PART No.	NOTES
R51	680Ω		53-1778	BTS-680	
R52	1.5Meg		53-1831	BTS-1.5Meg	
R53	22K	2	53-1866	BTS-22K	
R54	470Ω	1	53-1773	BTS-470	
R55	680Ω	1	53-3290	BTA-680	
R56	470K		53-1868	BTS-470K	
R57	3.3Meg		53-1833	BTS-3.3Meg	
R58	4700Ω		53-1813	BTS-4700	
R59	330K		53-1854	BTS-330K	
R60	100K		53-1869	BTS-100K	
R61	390K		53-1846	BTS-390K	
R62	33K		53-1841	BTS-33K	
R63	330K		53-1890	BTS-330K	
R64	100K		53-1869	BTS-100K	
R65	33K		53-1866	BTS-33K	
R66	220Ω		53-1788	BTS-220	
R67	3.3Meg		53-1826	BTS-3.3Meg	
R68	1000Ω	1	53-865	BTA-1000	
R69	390Ω				
R70	180Ω				
R71	1Meg		53-1821		
R72	1Meg		53-1821		
R73	1200Ω		53-1798		
R74	10Meg		53-1868	BTS-10Meg	
R75	10Meg		53-1868	BTS-10Meg	
R76	47K	1	53-1194	BTA-47K	
R77	560Ω		53-1807	BTS-560	
R78	10K	3	53-3145	BTS-10K	
R79	33K		53-1841	BTS-33K	
R80	68K		53-1863	BTS-68K	
R81	180K	1	53-3215	BTA-180K	
R83	33K		53-1841	BTS-33K	
R83	100Ω		53-1744	BTS-100	
R84	470K		53-1868	BTS-470K	
R85	10Ω		53-1744	BTS-10	
R86	8200Ω	3	53-3603		
R87	10K	4	53-3633	PW10-10K	
R88	22K		53-1841	BTS-22K	
R89	330K		53-3607	BTS-330K	
R90	3.3Ω		53-3255	BWS-3.3	
R91	3.3Ω		BW-3.3	BWS-3.3	Note 1

Note 1. Resistance of HV rectifier filament leads (length of #30 Advance resistance wire). When replacing with standard resistor, use standard HV filament wire in place of resistance wire.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	UTVAC	550VCT	5VAC	6.3VAC	95-1473				26R33 Ⓘ	
	Ⓖ1.6A	Ⓖ250A	Ⓖ3A	Ⓖ7.8A						

Ⓘ Parallel and phase 6.3V windings . Use Universal mounting brackets.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA ZENITH PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Rem PART No	Stancor PART No	Thordarson PART No	Triad PART No
T3	Horiz. Output Trans.	S-23995 S-23990 Ⓘ				X13Y *			
T3	Vert. Output Trans.	95-1475	21900 Ⓓ Ⓔ	A-3039 Ⓘ		V312 Ⓓ	A-8141 Ⓘ	26S54 Ⓓ	A-1092 Ⓘ Ⓓ
T4A	Yoke(90°) Horiz. (13MH)	96-1435 Ⓘ	DF800 Ⓓ	MDF-91E	237DN Ⓘ	T90F13/47 Ⓘ	DY-13A Ⓘ	Y-14 Ⓘ	Y-40-1 Ⓘ Ⓓ
B	Vert (49MH)								

Ⓘ Alternate Zenith part number.
Ⓓ Use 15 to 1 turns ratio.
Ⓔ Connect as auto transformers.
Ⓓ Drill new mounting hole[s].
Ⓘ Includes capacitor C78, resistors R69 and R70.
Ⓓ Use original yoke damping network if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTION	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rem Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4				4			
3				3			
2				2			
1				1			

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No	Triad PART No	NOTES
T5	10.1K	3-4Ω	95-1439					S-11X	

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA ZENITH PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	4"	PM	3-4Ω	49-773 Ⓘ	4A1	304S2	Ⓘ Used in Models Y2230R, U, Y2232Y, U, Y2232E, C, U.
	5 1/4"	PM	3-4Ω	49-751 Ⓘ	5SA1	217H	
	8"	PM	3-4Ω	49-780 Ⓘ	8A3L	308S3	Ⓘ Used in Models Y2232E, E2, R, RZ, RUZ, EUZ.
	10"	PM	3-4Ω	49-753 Ⓘ	10A3I	236S1	
	10"	PM	3-4Ω	49-764 Ⓘ S-23829 Ⓘ Ⓘ	10A10Z3. S		Ⓘ Used in Models Y2247E, E2, R, RZ RUZ, EUZ.
							Ⓘ Used in Models Y2230, U, Y2350R, U, Y2250E, U, Y2215E, S, EU.
							Ⓘ Used in Model Y2251R, S, U
							Ⓘ Electrostatic Speakers

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	1F Trap Coil	0Ω		20-567				
L3	1F Trap Coil	0Ω		20-567				
L3	Ant. Trans.	0Ω CT.	0Ω	S-23632				
L4	Ant. Coil	0Ω		20-600				Channel 13
L5	Ant. Coil	0Ω		20-628				Channel 5
L6	Ant. Coil	0Ω		20-628				Channel 5
L7	Ant. Coil	0Ω		20-628				Channel 4
L8	Ant. Coil	0Ω		20-628				Channel 4
L9	Ant. Coil	0Ω		20-628				Channel 3
L10	Fil. Choke	0Ω		20-635				
L11	Neut. Coil	0Ω		20-633				
L12	RF Coil	0Ω		20-630				Channel 13
L13	RF Coil	0Ω		20-571				Channels 7 Thru 13
L14	RF Coil	0Ω		20-579				Channel 6
L15	RF Coil	0Ω		20-629				Channel 6
L16	RF Coil	0Ω		20-629				Channel 5
L17	RF Coil	0Ω		20-629				Channel 4
L18	RF Coil	0Ω		20-629				Channel 4
L19	RF Coil	0Ω		20-629				Channel 3
L20	Osc. Coil	0Ω		20-637				Channel 13
L21	Osc. Coil	0Ω		20-626				Channel 6
L22	Osc. Coil	0Ω		20-625				Channel 5
L23	Osc. Coil	0Ω		20-622				Channel 4
L24	Osc. Coil	0Ω		20-624				Channel 3
L25	Osc. Coil	0Ω		20-632				Channel 3
L26	RF Choke	0Ω		20-632				
L27	Conv. Plate	4.5Ω		S-23577				Part #6-23756 Used With Tuner #6-23312
L32A	1st Video IF	.1Ω		S-24001				
	B1F Trap	.1Ω		S-23916				
	C RF Choke	0Ω		20-650				
L29	2nd Video IF	.1Ω	7.5Ω	S-23921				
L30	Cathode Trap	5.5Ω		S-24020				Tapped Ⓖ . 7Ω
L31	3rd Video IF	.1Ω	.5A-1Ω	S-23905			6219	
L32	4th Video IF	.3Ω	.3Ω	S-23480				Complete Assembly #6-23999
L33	Series Peaking Coil	4.3Ω		S-23444		19-8023		4636	25 Microhenries
L34	Shunt Peaking Coil	9.5Ω		S-16015		19-3300	TV-190	6132	235 Microhenries
L35A	4.5mc Trap	1Ω							
	41m Sound IF	1.5Ω		S-23350					
L36	Series Peaking Coil	5.3Ω		S-20880		19-3135*		6153*	137 Microhenries; Wound on 1MΩ Resistor Coil Part #6-23347
L37	2nd Sound IF	.3Ω	.4Ω	S-23345					
L39	Quadrature Coil	4.8Ω		S-19230				1490a	

* Parallel With 1MΩ Resistor
■ Drill Mfg. Hole

ZENITH MODELS Y2230R, RU, U, Y2232C, CU, E, EU, Y, YU, U, Y2232E, EU, R, RU, Y2247E, EU, R, RU, Y2250E, EU, R, RU, U, Y2258E, EU, H, HU, R, RU, U, Y2281E, EU, R, RU, U (Ch. 17Y2U, U, 17Y32, U)

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L39	170Ω		S-19743	19-1577		6324				Tapped @ 68Ω

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L40	.250A	66Ω	1.7 Hy.	95-1376	C5037 ①	C-2996 ①	C-2326 ①	26C44	C-23X

① Drill one new mounting hole.

FUSES

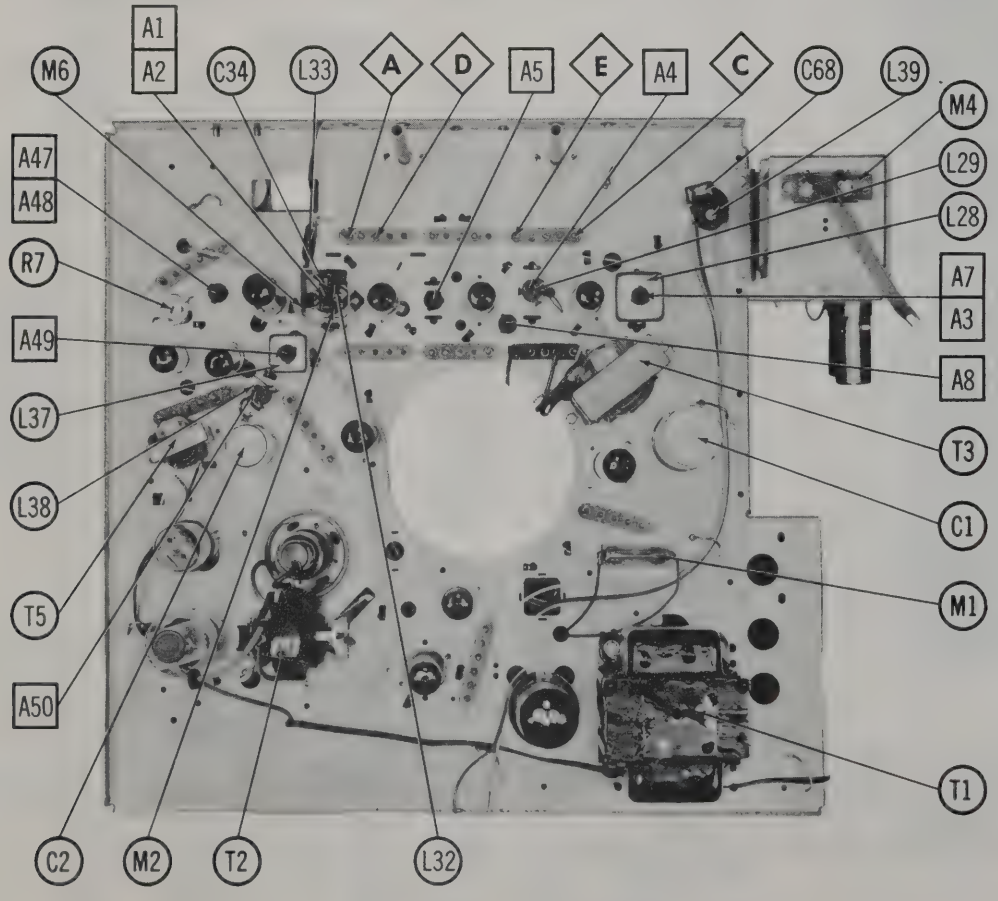
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ZENITH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	1/4A 125V	136-22		313.250 (3AG S/B 1/4A)	357001	MDL 1/4	4405

CRYSTAL DIODES

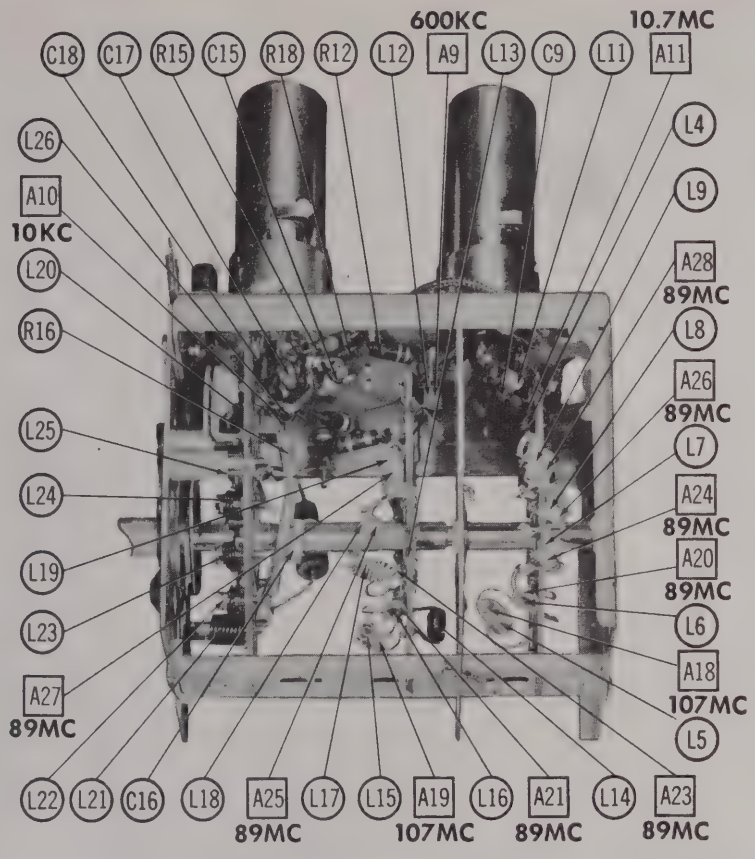
ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		ZENITH PART No.	SYLVANIA PART No.	
M2	1N64	103-18	1N60	Video Det. (Pigtail)

MISCELLANEOUS

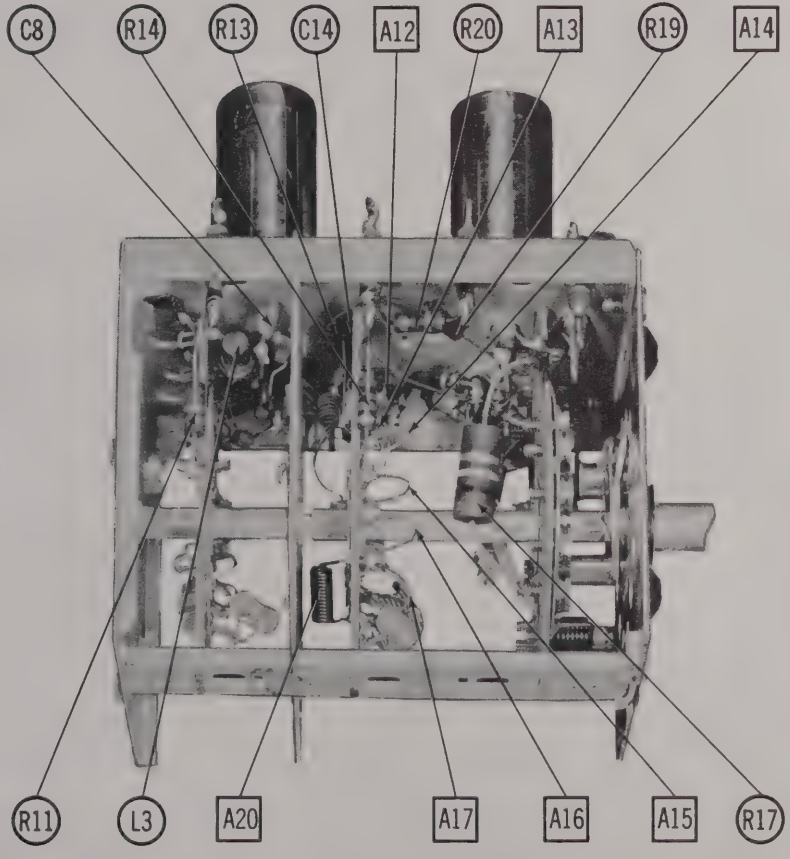
ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Dial Light	100-156	
M4	Tuner	S-24392	VHF (12 Position) Chassis 17Y20, 17Y22
	Tuner	S-24393	VHF (13 Position) Chassis 17Y20U, 17Y22U
M5	Tuner	S-22790	UHF-Chassis 17Y20U, 17Y22U
M6	Video Det. Assy.	S-23999	Includes M2, L32, & C34
M7	Integrator	87-5	Vertical
M8	Integrator	87-4	Vertical
M9	Centering Device	S-22560	
M10	Width Control	199-193	
M11	Ion Trap	S-17164	



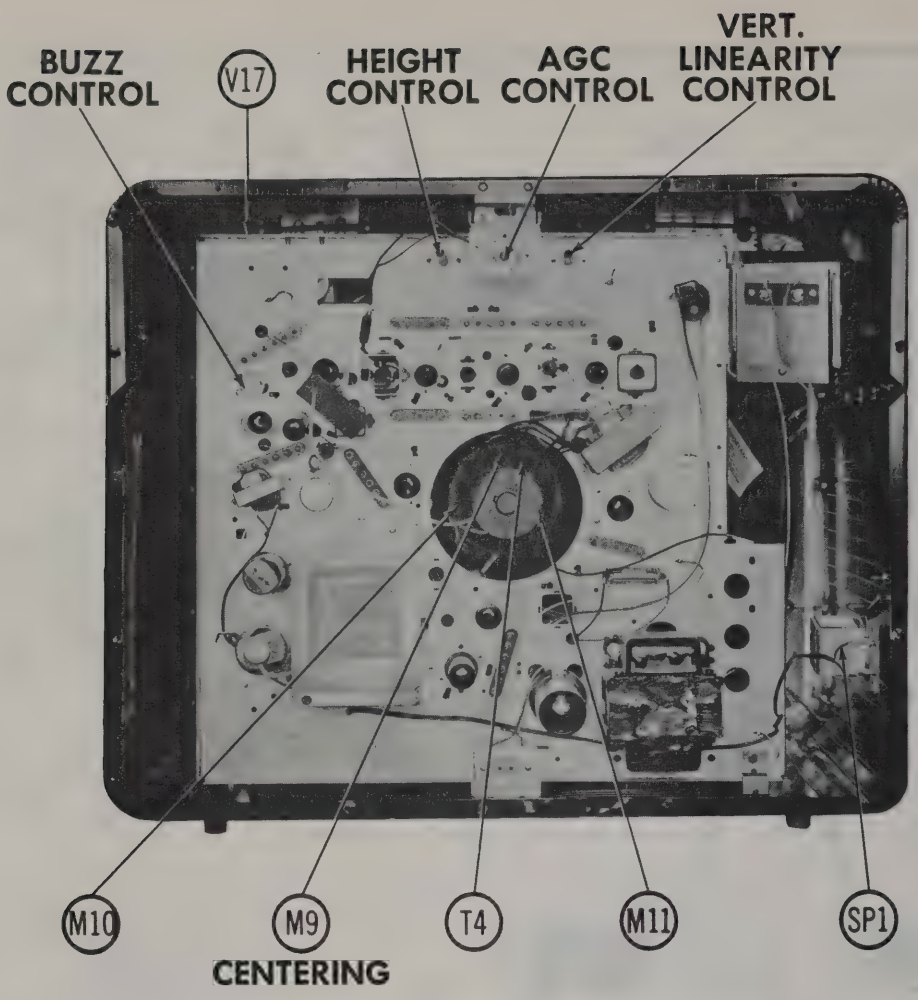
CHASSIS TOP VIEW



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



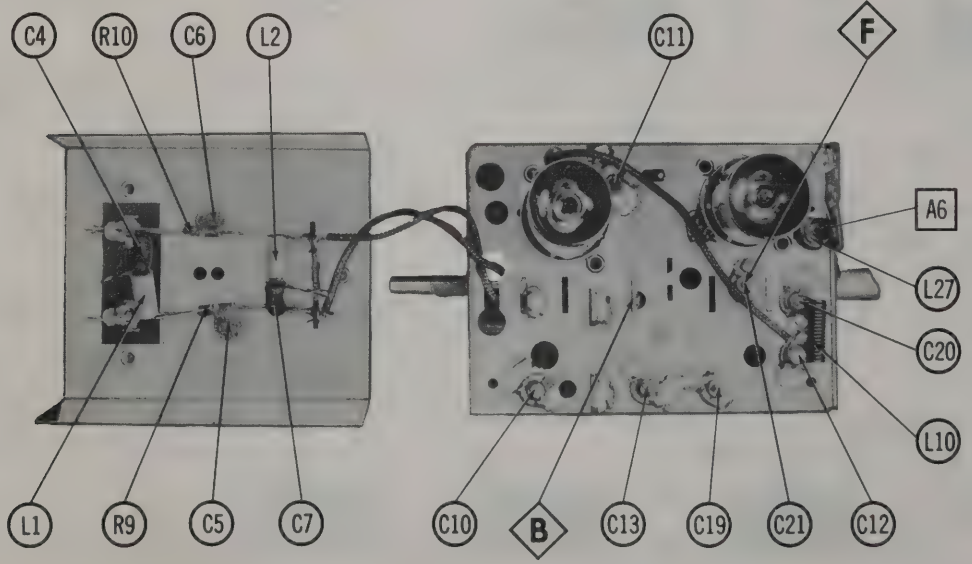
CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

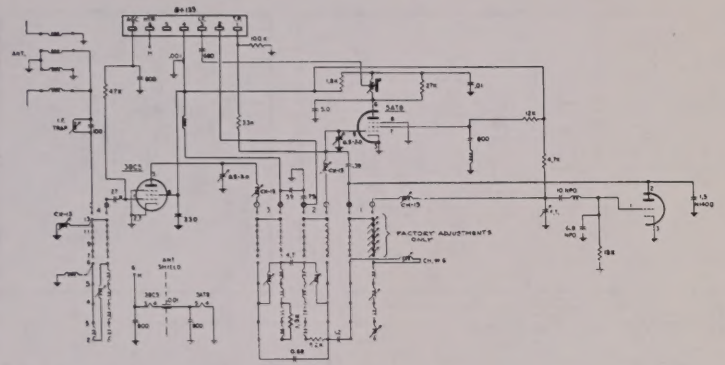
Turn the set on and tune in a TV station, preferably with a test pattern.

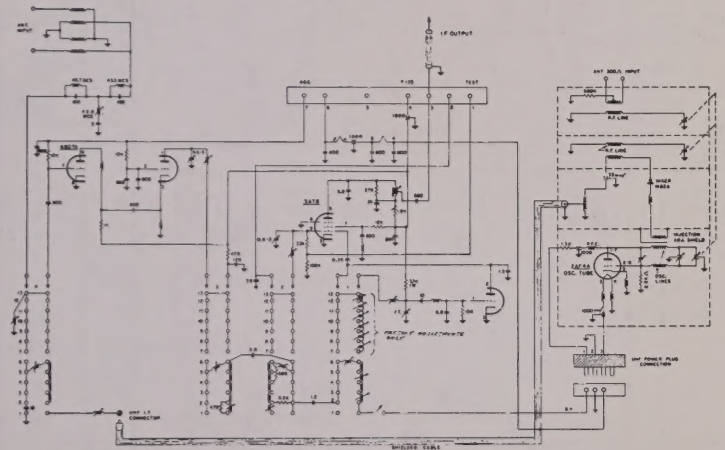
Adjust the horizontal hold located on the front panel on the set until the picture synchronizes horizontally. Switch off channel and back again. If picture loses sync, readjust the horizontal hold until the picture does remain in sync when switching off channel and back again.

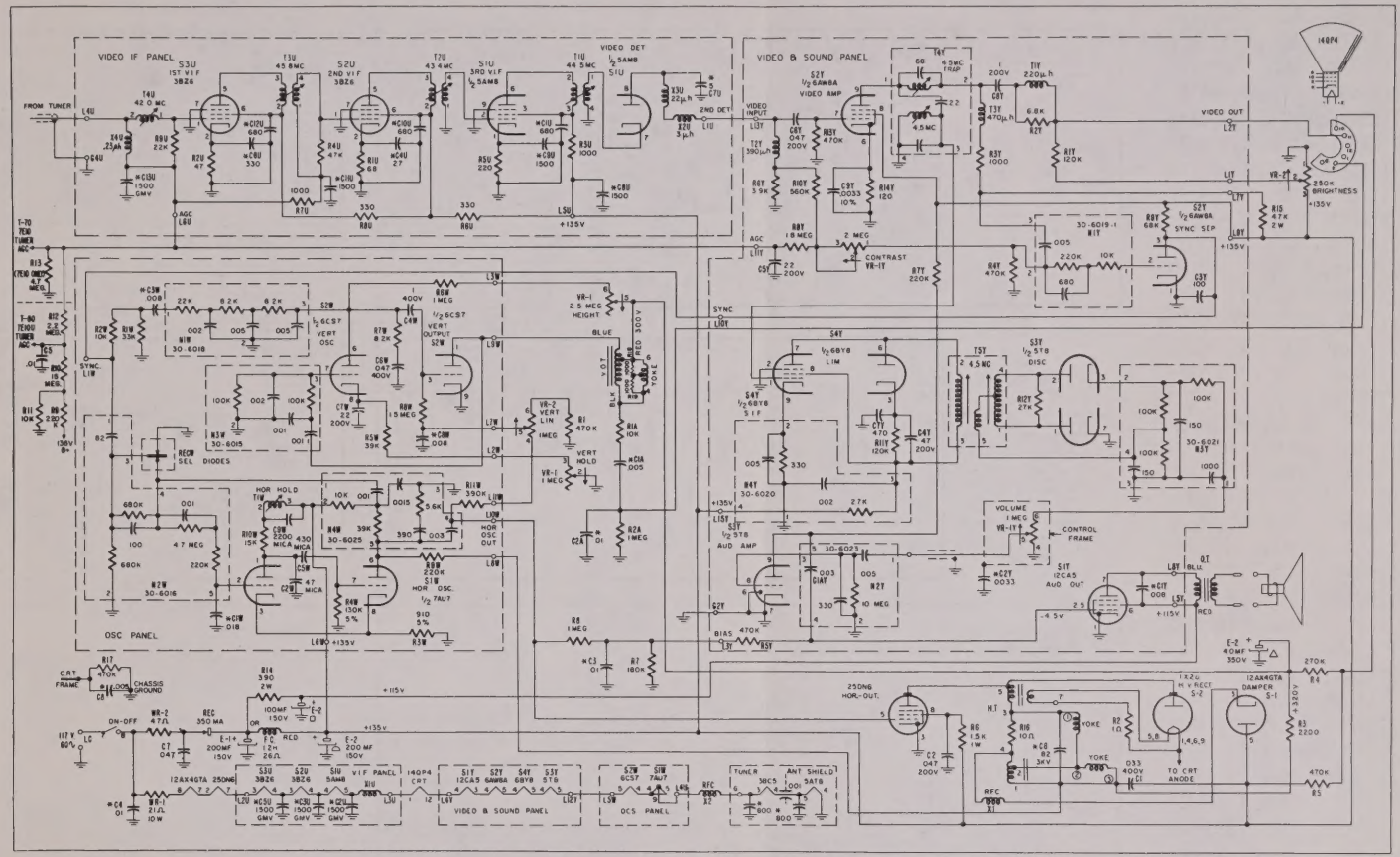
Adjust the brass width sleeve located on the neck of the picture tube by sliding in and out of the deflection yoke until the raster is slightly wider than necessary to fill the picture mask horizontally.



RF TUNER TOP VIEW





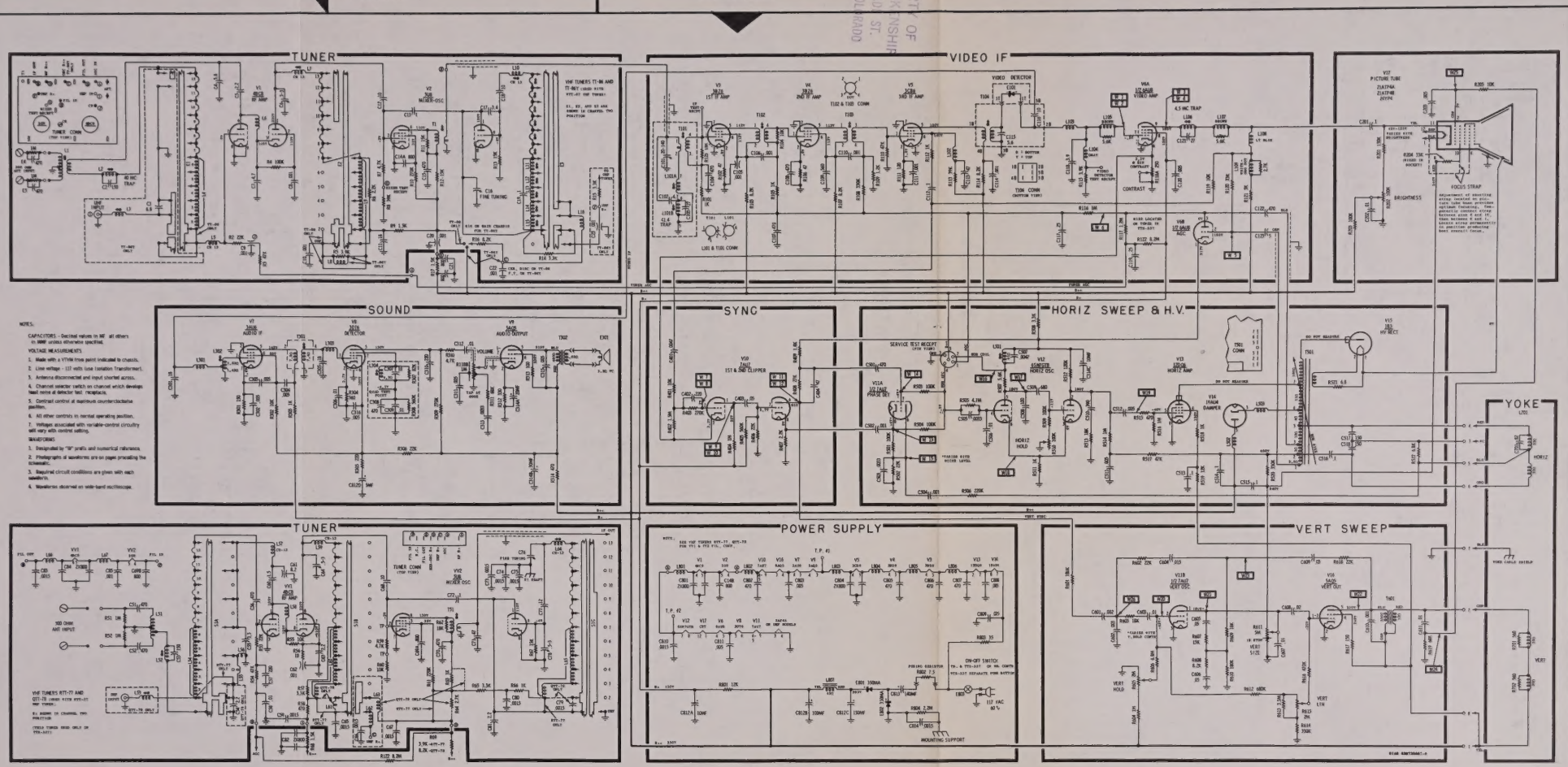


MODELS
E2002C (Ch. 7E10)
UE2002C (Ch. 7E10)

SCHEMATIC COURTESY OF PHILCO CORPORATION

PROPERTY OF F. BLANKENSHIP 3824 MEADE ST. DENVER, COLORADO

Y21K53B (Ch. TTS-537Y)
Y21K53BA (Ch. TS-537Y)
Y21K53M (Ch. TTS-537Y)
Y21K53MA (Ch. TS-537Y)
Y21K55B (Ch. TTS-537Y)
Y21K55BA (Ch. TS-537Y)
Y21K55M (Ch. TTS-537Y)
Y21K55MA (Ch. TS-537Y)
Y21T32B (Ch. TTS-537Y)
Y21T32BA (Ch. TS-537Y)
Y21T32CH (Ch. TTS-537Y)
Y21T32CHA (Ch. TS-537Y)
Y21T32MGA (Ch. TS-537Y)
Y21T34B (Ch. TTS-537Y)
Y21T34BA (Ch. TS-537Y)
Y21T34M (Ch. TTS-537Y)
Y21T34MA (Ch. TS-537Y)
Y24K13B, M (Ch. WTS-537Y)
Y24T5BG, MG (Ch. WTS-537Y)
21K53B (Ch. TTS-537)
21K53BA (Ch. TS-537)
21K53M (Ch. TTS-537)
21K53MA (Ch. TS-537)
21K55B (Ch. TTS-537)
21K55BA (Ch. TS-537)
21K55M (Ch. TTS-537)
21K55MA (Ch. TS-537)
21T32B (Ch. TTS-537)
21T32BA (Ch. TS-537)
21T32CH (Ch. TTS-537)
21T32CHA (Ch. TS-537)
21T32MGA (Ch. TS-537)
21T34B (Ch. TTS-537)
21T34BA (Ch. TS-537)
21T34M (Ch. TTS-537)
21T34MA (Ch. TS-537)
24K13B, M (Ch. WTS-537)
24T5BG, MG (Ch. WTS-537)



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